

411-CD-004-001

EOSDIS Core System Project

ECS System Acceptance Test Procedures - Volume 4 LaRC Procedures for the ECS Project

September 1996

Hughes Information Technology Systems
Upper Marlboro, Maryland

ECS System Acceptance Test Procedures - Volume 4 LaRC Procedures for the ECS Project

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SUBMITTED BY

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Preface

This document is a formal contract deliverable with an approval code 1. It requires Government review and approval prior to acceptance and use. This document is under ECS contractor configuration control. Once this document is approved, Contractor approved changes are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

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Abstract

The ECS System Acceptance Test procedures documents contain the specific test instructions to completely verify that the TRMM ECS release (ECS Release A) installed at the GSFC, LaRC, and EDC DAACs, and the EOC and SMC sites satisfy the level 3 requirements documented in the Functional and Performance Requirements Specification (F&PRS).

There is a separate set of test procedures for each DAAC, the EOC and SMC. The test procedures are delivered as separate volumes for each site.

These test procedures were developed using the July 31st, 1996, Requirements Traceability Management (RTM) baseline (RELA_TRR_073196).

Keywords: Acceptance test, ECS Release A, level 3 requirements, LaRC

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Appendix A. Test Sequences Mapped to External Interfaces

Appendix B. Test Sequences Mapped to Operations Scenarios

**Appendix C. Test Procedures Mapped to
M&O Operations Manual**

Appendix D. Test Sequences Mapped to LaRC Hardware

Appendix E. Test Procedure Format

Abbreviations and Acronyms

Glossary

1. Introduction

1.1 Identification

The Acceptance Test Procedures (ATPr), Contract Data Requirement List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The Release A ECS System Acceptance Test Procedures describe the approach the Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Acceptance Test Procedures - Volumes 1-5 contain the step by step test procedures for each Release A site. Figure 1-1 graphically depicts the Release A ECS System Acceptance Test Procedures volumes.

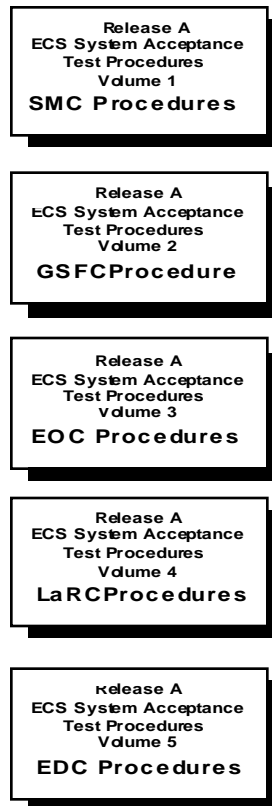


Figure 1-1. ECS System Acceptance Test Procedure Volumes

1.2 Scope

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight Center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of TRMM operations, receives a minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of the test results.

1.3 Purpose

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

1.4 Status and Schedule

The submittal of DID 411/VE1 meets the milestone specified in the Contract Data Requirements List (CDRL) for ECS Overall System Acceptance Test Procedures of NASA contract NAS5 60000. The submittal schedule is three months prior to the ECS Release A Release Readiness Review (RRR).

1.5 Organization

This document is organized in five volumes. The Release A ECS System Acceptance Test Procedures - Volumes 1 through 5 contains the step-by-step test procedures at each site.

The Release A ECS System Acceptance Test Procedures - Volumes 1-5 where-in the detailed procedures for each individual site are detailed. Sections 7-12 of Volumes 1-5 map directly to the material introduced in corresponding sections of the Release A ATPr's listed below.

- Section 1: Introduction- Provides information regarding the identification, scope, purpose, status and schedule, and organization of this document.
- Section 2: Related Documents: Provides a listing of parent documents, applicable documents, and documents which are used as source information.
- Section 3: Acceptance Test Overview- Describes Release A capabilities and provides an overview of the acceptance functional and interface tests. Acceptance test roles and responsibilities are also described.
- Section 4: Test Tools- Describes the test tools used by IATO to conduct ECS Release A System Acceptance Tests.
- Section 5: Test Execution and Coordination-Discusses the process by which formal acceptance testing is managed on a daily basis.
- Section 6: Release A Test Schedule- Depicts the overall ECS acceptance test schedule and coordination activities.

Sections 1-6 of Volumes 1-5 describes the approach that the IATO takes to Test ECS.

- Section 7: Test Site Environment- Provides an overview of the individual site test environment.
- Section 8: System Management Scenario Group- Contains the detailed procedures for the system management group of requirements.
- Section 9: Push Scenario Group- Contains the detailed procedures for the push scenario group of requirements.
- Section 10: Pull Scenario Group- Contains the detailed procedures for the pull scenario group of requirements.
- Section 11: Flight Operations Scenario Group- Contains the detailed procedures for the Flight Operations scenario group of requirements.
- Section 12: End-to-End Scenario Group- Contains the detailed procedures for the end-to-end scenario group of requirements.

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2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which the scope and content of this document are derived.

194-401-VE1-002	Verification Plan for the ECS Project, Final
409-CD-001-004	ECS Overall System Acceptance Test Plan for Release A
420-05-03	Earth Observing System (EOS) Performance Assurance Requirements for EOSDIS Core System (ECS)
423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS)

2.2 Applicable Documents

The following documents are referenced within this Test Procedures document, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document.

107-CD-002-XXX	Level 1 Master Schedule for the ECS Project (published monthly)
505-41-11	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and the Version 0 System, 10/95
505-41-12	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and Science Computing Facilities, 5/95
505-41-14	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and Tropical Rainfall Measuring Mission (TRMM) Ground System, 2/95
505-41-15	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS the AM project for AM-1 Flight Operations, 7/95
505-41-17	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and the NASA Science Internet (NSI), 10/95

505-41-18	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS and MITI ASTER GDS Project, 7/95
505-41-19	Goddard Space Flight Center, Interface Requirements Document Between the EOSDIS Core System (ECS) and the National Oceanic and Atmospheric Administration (NOAA) Affiliated Data Center (ADC), 5/95
505-41-21	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and NASA Institutional Support Systems (NISS), 5/95
505-41-32	Goddard Space Flight Center, Interface Requirements Document Between Earth Observing System Data and Information System, and the Landsat 7 System, 7/95
560-EDOS-0211.0001	Interface Requirements Document (IRD) Between the Earth Observing System (EOS) Data and Operations System (EDOS), and the EOS Ground System (EGS) Elements

2.3 Information Documents

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document, but are not binding on the content of this ECS System Acceptance Test Procedures document.

222-TP-003-008 Release Plan Content Description for the ECS Project

3. Acceptance Test Overview

The Earth Observing System (EOS) Data Information System (EOSDIS) Core System (ECS) capabilities are developed in terms of four formal releases. The first of the four formal releases include capabilities necessary to fully support the scheduled launch and ongoing operations for Tropical Rainfall Measuring Mission (TRMM), interface testing for Landsat-7, and command and control interface testing for AM-1. This first release, called Release A, supports data operations that follow at the EOS Operations Center (EOC), System Management Center (SMC) and three Distributed Active Archive Centers (DAACs). The DAACs that are activated for Release A are located at Goddard Space Flight Center (GSFC), Langley Research Center (LaRC), and the EROS Data Center (EDC).

3.1 Release A Capabilities

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for down stream deliveries. Ir1 also provided science software integration and testing capabilities. For Release A, the Ir1 configurations of GSFC, and LaRC are updated with major hardware and software deliveries while EDC, which is not part of TRMM operations, receives a minor update to support interface testing. Release A provides initial capabilities at the EOC and SMC, which include support to early interface testing and core FOS functionality. Table 3-1 summarizes the Ir1 capabilities and Release A enhancements.

Table 3-1. ECS Ir1 to Release A Enhancements

SITE	Release Ir1 Capabilities	New Release A Capabilities Deployed at Each Site
SMC	System Performance Monitoring	System Performance Monitoring and Analysis; WAN Management; and System Coordination
GSFC	TRMM Mission Support; VIRS Data Ingest, Ingest, Ancillary Data	TRMM Mission Support; VIRS Data Ingest, Archive & Distribution ; Ingest Ancillary Data; AM-1 Interface Testing; AM-1 MODIS Science Software I&T; VO Data Migration & Interoperability; TOMS Ozone Data Ingest and Archive; and System Resource Management
LaRC	TRMM Mission Support; TRMM CERES Data Ingest; NOAA Ancillary Data Ingest	TRMM Mission Support; TRMM CERES Data Ingest, Production, Archive & Distribution; Data Migration & Interoperability; AM-1 Interface Testing; NOAA Ancillary Data Ingest; TRMM & AM-1 CERES, and MISR and MOPITT Science Software I&T; SAGE Aerosol & Ozone Data, and ISCCP Data Ingest and Archive; and System Resource Management
EDC	Landsat-7 Interface Testing; Landsat-7 Level-0R Data Ingest	Landsat-7 Interface Testing; Landsat-7 Level-0R Data Ingest; ASTER/MODIS Science Software I&T; Ingest and Storage of Landsat-7 L0R data; and System Resource Management
EOC		AM-1 Interface Testing; ASTER GDS, SCF, NCC, EDOS, and FDF Interface Testing; core FOS functionality, and System Resource Management

3.2 Release A Acceptance Test Approach

The acceptance testing of Release A capabilities is divided into five major scenario groups: System Management, Push, Pull, Flight Operations, and End-to-End. These scenario groups identify high

level ECS functionality from a users and operations viewpoint. Each group is sub-divided into scenarios that emulate the operations and user environment. Scenarios are further broken down into more manageable test sequences in which test procedures that trace to level 3 requirements are executed. The Requirements and Traceability Management (RTM) Tool is used for the purpose of tracking level 3 requirements' test status.

3.2.1 ECS Functional Tests

The complete set of ECS functions allocated to Release A are verified to ensure that the release meets those requirements needed to support TRMM and provide core functionality for the AM-1 missions. This includes verifying requirements for all features needed to support the ECS Release objectives for spacecraft operations and control, scheduling, data operations, information management and archive, science processing, networks, and system management.

Acceptance testing include the verification of certain ECS features needed to support TRMM. These features are: the ingest, archive processing, and distribution of Level-1 through Level-3 of Precipitation Radar (PR), TRMM Microwave Imager (TMI), and Visible Infrared Scanner (VIRS) instrument data; and TRMM Ground Validation (GV) data transmitted from the TSDIS, which is a production system provided by the TRMM project. Additional features include the ingest, archive, product generation, and distribution of TRMM CERES and LIS instrument data received from the SDPF.

3.2.2 Interface Acceptance Tests

Acceptance testing verifies system compliance to level 3 requirements by focusing on the objectives and capabilities specified for Release A. These capabilities are tested for functionality and performance within the boundaries of the interfaces defined for the release. The external boundary of ECS is typically at communications, data medium or graphic interfaces. For communications, these interfaces act as conduits through which input (Level-0) and output data (Level-1, Level-2, etc.), and stimuli (commands, requests, etc.) and responses (acknowledgments, data, etc.) flow. The communications interfaces to be verified for Release A include National Aeronautics and Space Administration (NASA) Science Internet (NSI), NASA Communications (NASCOM) Operational Local Area Network (NOLAN), and EOSDIS Backbone network (EBnet) where they terminate at the applicable ECS sites. At the ECS, these interfaces are physically located at the SMC and EOC; and the ECS GSFC, LaRC and EDC DAAC sites. The communications networks that are connected to the ECS terminate at two classes of external systems: data providers (whose science data are later referred to as push data) and data users (whose requests result in what later are referred to as pull data). The data providers for Release A are the Sensor Data Processing Facility (SDPF), ECS Data and Operation System (EDOS), Flight Dynamics Facility (FDF), Network Communications Center (NCC), the Landsat Processing System (LPS), and the TRMM Science Data and Information System (TSDIS). The data users for TRMM are the science user community at the DAACs and the SCFs. The node chart in Figure 3-1 depicts the interconnection of external systems with ECS. A summary of the content and carriers associated with the data flowing across ECS interfaces is shown in Table 3-2. A more complete account of each interface may be found in Interface Control Documents 209/SE1-001 through 020.

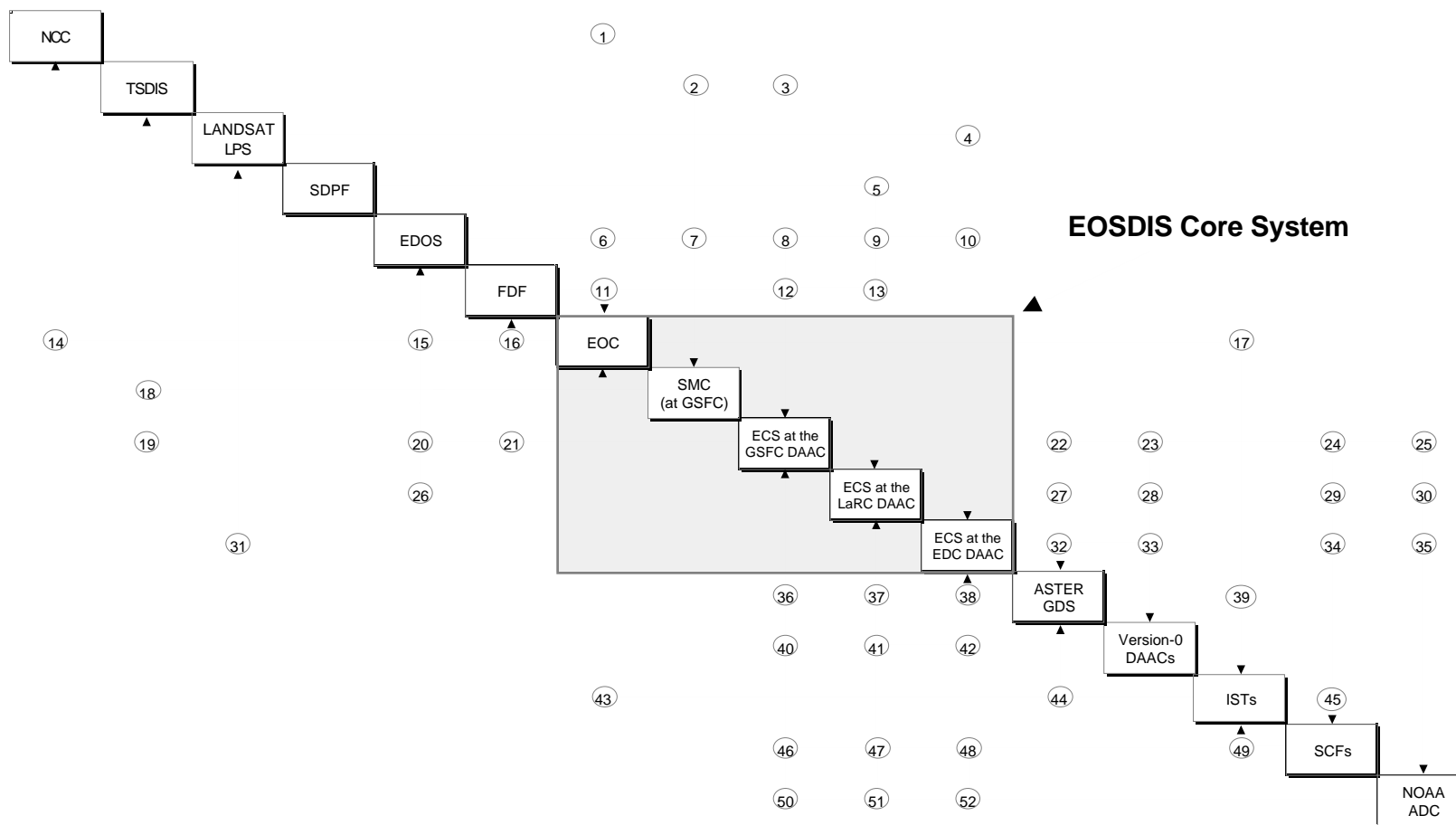


Figure 3-1. ECS Release A Interfaces with the EOS Ground System

Table 3-2. ECS Release A Data Flow Interfaces (1 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
1	AM-1	NCC	EOC	EBnet	GCM status and disposition messages.	305-CD-040-001 530-ICD-NCCDS/ MOC, Annex 4 329-CD-001-003	Oct-95 Sep-95 Oct-95
2	TRMM	TSDIS	SMC at GSFC	Email/ Phone	Schedule Coordination & Adjudication for Data Exchange with DAACs; and Status Information.	209-CD-007-001 Section 4	Jan-95
3	TRMM	TSDIS	ECS at the GSFC DAAC	Exchange LAN	Levels 1A to 3 TMI, PR, GV, VIRS and Combined Data Products, Browse Products, and Metadata; Updated Metadata; TMI, PR, GV, VIRS, Combined Algorithms and Documentation; Reprocessing Product Schedules, and Delayed Product Status; Request for Ancillary Data.	209-CD-007-004 Figure 5-1	May-96
4	Landsat-7	Landsat LPS	ECS at the EDC DAAC	Landsat Network	Data Availability Notice; Level 0R Data; Level 0R Inventory Metadata; Level 0R Browse.	209-CD-013-003 Table 3-1	Mar-96
5	TRMM	SDPF	ECS at the LaRC DAAC	EBnet	Quicklook Data Product; Level-0 Data Products; Ephemeris Data File.	510-203.103 Table 10-3	Apr-96
6	AM-1	EDOS	EOC	EBnet	Spacecraft and instrument real time housekeeping and health and safety telemetry; Real-time and rate-buffered.	510-ICD-EDOS Table 4.2.2-1 307-CD-001-003 329-CD-001-003	Jan-96 Oct-95 Oct-95
7	AM-1	EDOS	SMC at GSFC	EBnet	Summary Performance Report.	510-ICD-EDOS/EGS	Jan-96
8	AM-1	EDOS	ECS at the GSFC DAAC	EBnet	Service Request Disposition; PDSs (Level-0 data); ADSs (Back-up Level-0 Data); PDS and ADS Delivery Records; Physical Media Unit Delivery Record; Undetected Fault Isolation.	305-CD-014-001 Table 3.2-1	Jul-95
9	AM-1	EDOS	ECS at the LaRC DAAC	EBnet	Service Request Disposition; PDSs (Level-0 data); PDS Delivery Record; Undetected Fault Isolation.	305-CD-015-001 Table 3.2-1	Jul-95
10	AM-1	EDOS	ECS at the EDC DAAC	EBnet	Level-0; Quick Look, Status; and Coordination Data.	222-TP-003-005 Section 5	Dec-94
11	AM-1	FDF	EOC	EBnet	Basic connectivity test messages.	307-CD-001-003 329-CD-001-003	Oct-95 Oct 95
12	AM-1	FDF	ECS at the GSFC DAAC	NOLAN	Repaired Orbit Data.	305-CD-014-001 Table 3.2-1	Jul-95

Table 3-2. ECS Release A Data Flow Interfaces (2 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
13	AM-1	FDF	ECS at the LaRC DAAC	NOLAN	Refined Orbit/Attitude data.	305-CD-015-001 Table 3.2-1	Jul-95
14	AM-1	EOC	NCC	EBnet	Ground Configuration Message Requests.	305-CD-040-001 530-ICD-NCCDS/ MOC, Annex 4 329-CD-001-003	Oct-95 Sep-95 Oct-95
15	AM-1	EOC	EDOS	EBnet	Spacecraft and instrument commands.	510-ICD-EDOS Table 4.2.2-1 307-CD-001-003 329-CD-001-003	Jan-96 Oct-95 Oct-95
16	AM-1	EOC	FDF	EBnet	Basic connectivity test messages.	307-CD-001-003 329-CD-001-003	Oct-95 Oct-95
17	AM-1	EOC	ISTs	NSI	Spacecraft and instrument telemetry.	305-CD-040-001 307-CD-001-003 329-CD-001-003	Oct-95 Oct-95 Oct-95
18	TRMM	SMC at GSFC	TSDIS	Email/Phone	Schedule Coordination & Adjudication for Data Exchange with DAACs; and Status Information.	209-CD-007-001 Section 4	Jan-95
19	TRMM	ECS at the GSFC DAAC	TSDIS	Exchange LAN	Levels 1A to 3 TMI, PR, GV, VIRS, and Combined Data Products for Reprocessing; Ancillary Data for Processing and Reprocessing; TRMM Orbit Ephemeris; TRMM Level-0 Housekeeping data.	209-CD-007-004 Figure 5-1	May-96
20	AM-1	ECS at the GSFC DAAC	EDOS	EBnet	Service Requests (Back-up data requests); Fault report; Fault Isolation Request; Level-0 data.	305-CD-014-001 Table 3.2-1	Jul-95
21	AM-1	ECS at the GSFC DAAC	FDF	NOLAN	Repaired/Retained Orbit Data Request.	305-CD-014-001 Table 3.2-1	Jul-95
22	AM-1	ECS at the GSFC DAAC	ASTER GDS	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
23	All Missions	ECS at the GSFC DAAC	Version-0 DAACs	EBnet	Directory Search Requests; Inventory Search Requests; Acknowledgments; Browse Request; Product Request; Statistics; Quit; Pong.	209-CD-011-004 Figure 4-2	Mar-96

Table 3-2. ECS Release A Data Flow Interfaces (3 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
24	AM-1	ECS at the GSFC DAAC	SCFs	NSI	ECS Software Package; I & T Requirements; Science Software Integration Test Status; Data Availability notices; Operational Science Data Production Software Package; Test Product Availability Message during Software I & T; QA Notification Specification Acknowledgement; Data Quality Request Notification; Data Delivered for QA; Processing Status; Resource usage; Reprocessing Request Acknowledgement; Product history.	209-CD-005-005 Figure 3.1-1	Mar-96
25	AM-1	ECS at the GSFC DAAC	NOAA ADC	NSI	Inventory Search; Browse Request; Product Request; Guide Search.	209-CD-006-005 Figure 5-1	Mar-96
26	AM-1	ECS at the LaRC DAAC	EDOS	Ebnet	Fault report; Fault Isolation Request; Level-0 data.	305-CD-015-001 Table 3.2-1	Jul-95
27	AM-1	ECS at the LaRC DAAC	ASTER GDS	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
28	All Missions	ECS at the LaRC DAAC	Version-0 DAACs	EBnet	Directory Search Requests; Inventory Search Requests; Acknowledgments; Browse Request; Product Request; Statistics; Quit; Pong.	209-CD-011-004 Figure 4-2	Mar-96

Table 3-2. ECS Release A Data Flow Interfaces (4 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
29	AM-1	ECS at the LaRC DAAC	SCFs	NSI	ECS Software Package; I & T Requirements; Science Software Integration Test Status; Data Availability notices; Operational Science Data Production Software Package; Test Product Availability Message during Software I & T; QA Notification Specification Acknowledgement; Data Quality Request Notification; Data Delivered for QA; Processing Status; Resource usage; Reprocessing Request Acknowledgement; Product history.	209-CD-005-005 Figure 3.1-1	Mar-96
30	AM-1	ECS at the LaRC DAAC	NOAA ADC	NSI	Inventory Search; Browse Request; Product Request; Guide Search.	209-CD-006-005 Figure 5-1	Mar-96
31	Landsat-7	ECS at the EDC DAAC	Landsat LPS	Landsat Network	Data Transfer Acknowledgment.	209-CD-013-003 Table 3-1	Mar-96
32	AM-1	ECS at the EDC DAAC	ASTER GDS	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
33	All Missions	ECS at the EDC DAAC	Version-0 DAACs	EBnet	Directory Search Requests; Inventory Search Requests; Acknowledgments; Browse Request; Product Request; Statistics; Quit; Pong.	209-CD-011-004 Figure 4-2	Mar-96

Table 3-2. ECS Release A Data Flow Interfaces (5 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
34	AM-1	ECS at the EDC DAAC	SCFs	NSI	ECS Software Package; I & T Requirements; Science Software Integration Test Status; Data Availability notices; Operational Science Data Production Software Package; Test Product Availability Message during Software I & T; QA Notification Specification Acknowledgement; Data Quality Request Notification; Data Delivered for QA; Processing Status; Resource usage; Reprocessing Request Acknowledgement; Product history.	209-CD-005-005 Figure 3.1-1	Mar-96
35	AM-1	ECS at the EDC DAAC	NOAA ADC	NSI	Inventory Search; Browse Request; Product Request; Guide Search.	209-CD-006-005 Figure 5-1	Mar-96
36	AM-1	ASTER GDS	ECS at the GSFC DAAC	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
37	AM-1	ASTER GDS	ECS at the LaRC DAAC	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
38	AM-1	ASTER GDS	ECS at the EDC DAAC	Tape	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.	209-CD-002-003 Figure 3-1	Mar-96
39	AM-1	ASTER GDS	ISTs (ASTER only)	ASTER LAN	One-day schedule; Short-term schedule.	209-CD-002-003 307-CD-001-003 329-CD-001-003	Mar-96 Oct-95 Oct-95

Table 3-2. ECS Release A Data Flow Interfaces (6 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
40	All Missions	Version-0 DAACs	ECS at the GSFC DAAC	Ebnet	Directory Search Results; Inventory Search Results; ftp and Integrated Browse Results; Product Results; Quit; Pong; NCEP Ancillary data.	209-CD-011-004 Figure 4-2	Mar-96
41	All Missions	Version-0 DAACs	ECS at the LaRC DAAC	EBnet	Directory Search Results; Inventory Search Results; ftp and Integrated Browse Results; Product Results; Quit; Pong.	209-CD-011-004 Figure 4-2	Mar-96
42	All Missions	Version-0 DAACs	ECS at the EDC DAAC	EBnet	Directory Search Results; Inventory Search Results; ftp and Integrated Browse Results; Product Results; Quit; Pong.	209-CD-011-004 Figure 4-2	Mar-96
43	AM-1	ISTs	EOC	NSI, EBnet for ASTER IST	Instrument planning, Instrument Microprocessor Memory Loads.	305-CD-040-001 307-CD-001-003 329-CD-001-003	Oct-95 Oct-95 Oct-95
44	AM-1	ISTs (ASTER only)	ASTER GDS	ASTER LAN	Basic connectivity test messages.	307-CD-001-003 329-CD-001-003	Oct-95 Oct-95
45	AM-1	ISTs	SCFs	Site Campus Networks	Instrument Analysis Results.	305-CD-040-001 307-CD-001-003 329-CD-001-003	Oct-95 Oct-95 Oct-95
46	AM-1	SCFs	ECS at the GSFC DAAC	NSI	Algorithms; Remote Access Session Dialog; Request for Operational Data Production Software Package; Request for Test Products after Software Integration and Test; Test Product Reviews; QA Notification Specification; QA Metadata Updates; Request for Processing Status; Request for Resource Usage; Reprocessing Requests.	209-CD-005-005 Figure 3.1-1	Mar-96
47	AM-1	SCFs	ECS at the LaRC DAAC	NSI	Algorithms; Remote Access Session Dialog; Request for Operational Data Production Software Package; Request for Test Products after Software Integration and Test; Test Product Reviews; QA Notification Specification; QA Metadata Updates; Request for Processing Status; Request for Resource Usage; Reprocessing Requests.	209-CD-005-005 Figure 3.1-1	Mar-96

Table 3-2. ECS Release A Data Flow Interfaces (7 of 7)

Node	Mission	Source	Destination	Carrier/Media	Data Content	Source	Date
48	AM-1	SCFs	ECS at the EDC DAAC	NSI	Algorithms; Remote Access Session Dialog; Request for Operational Data Production Software Package; Request for Test Products after Software Integration and Test; Test Product Reviews; QA Notification Specification; QA Metadata Updates; Request for Processing Status; Request for Resource Usage; Reprocessing Requests.	209-CD-005-005 Figure 3.1-1	Mar-96
49	AM-1	SCFs	ISTs	Site Campus Networks	Instrument Microprocessor Memory Loads.	305-CD-040-001 307-CD-001-003 329-CD-001-003	Oct-95 Oct-95 Oct-95
50	AM-1	NOAA ADC	ECS at the GSFC DAAC	NSI	Advertising Information; Dependent Valid Update; Inventory Search Result; Integrated Browse Result; FTP Browse Result; Product Result Message; Guide Result; NCEP Ancillary data.	209-CD-006-005 Figure 5-1	Mar-96
51	AM-1	NOAA ADC	ECS at the LaRC DAAC	NSI	Advertising Information; Dependent Valid Update; Inventory Search Result; Integrated Browse Result; FTP Browse Result; Product Result Message; Guide Result.	209-CD-006-005 Figure 5-1	Mar-96
52	AM-1	NOAA ADC	ECS at the EDC DAAC	NSI	Advertising Information; Dependent Valid Update; Inventory Search Result; Integrated Browse Result; FTP Browse Result; Product Result Message; Guide Result.	209-CD-006-005 Figure 5-1	Mar-96

The capability of the ECS to communicate and transfer data over the external interfaces in accordance with the F&PRS and applicable IRDs are verified during acceptance tests. Data content flowing across Release A interfaces include TRMM data from SDPF and simulated AM-1 data from EDOS; ancillary data from NOAA and FDF; schedule data to/from SDPF, ground configuration messages to/from NCC, Level-1 through Level-3 TRMM data from TSDIS; Landsat-7 Level-0, metadata and browse data from the Landsat LPS; and selected Level-0 through Level-4 to the SCFs. The context chart in Figure 3-2 graphically depicts Release A key interfaces between GSFC and LaRC. The context chart in Figure 3-3 graphically depicts the Release A Landsat-7 and AM-1 key interfaces. The capability of the ECS to provide TRMM pre-launch

ground system end-to-end test support, and AM-1 and Landsat-7 interface testing support are verified in acceptance tests for Release A. Tests to verify two-way inter-operability with the Version-0 system and migration and/or access of Version 0 data archives are also conducted as well as one-way inter-operability with NOAA.

Command and control interfaces to support AM-1 early interface testing are conducted. These tests include EOC planning, scheduling, command, control and monitoring of the AM-1 spacecraft; and CSMS system management and communications infrastructure.

The interfaces needed to support early Landsat-7 interface testing are also verified. These interfaces are those needed for: the receipt and storage of Landsat-7 level-0R data (viewable image data with radiometric and geometric information appended but not applied) at the EDC DAAC and the receipt and storage of Landsat-7 metadata and browse data at the EDC DAAC.

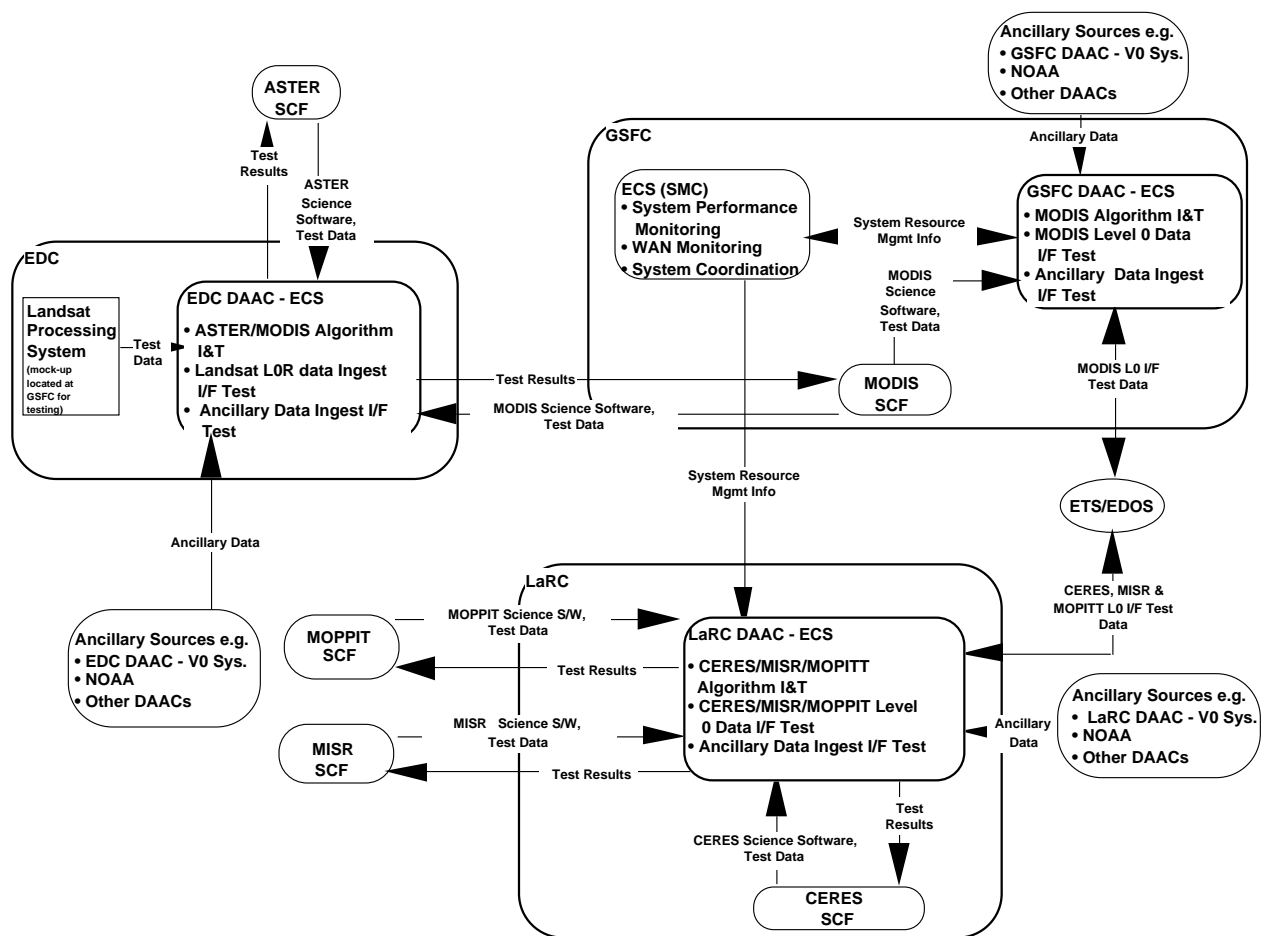


Figure 3-2. Release A Key Interfaces Between GSFC and LaRC

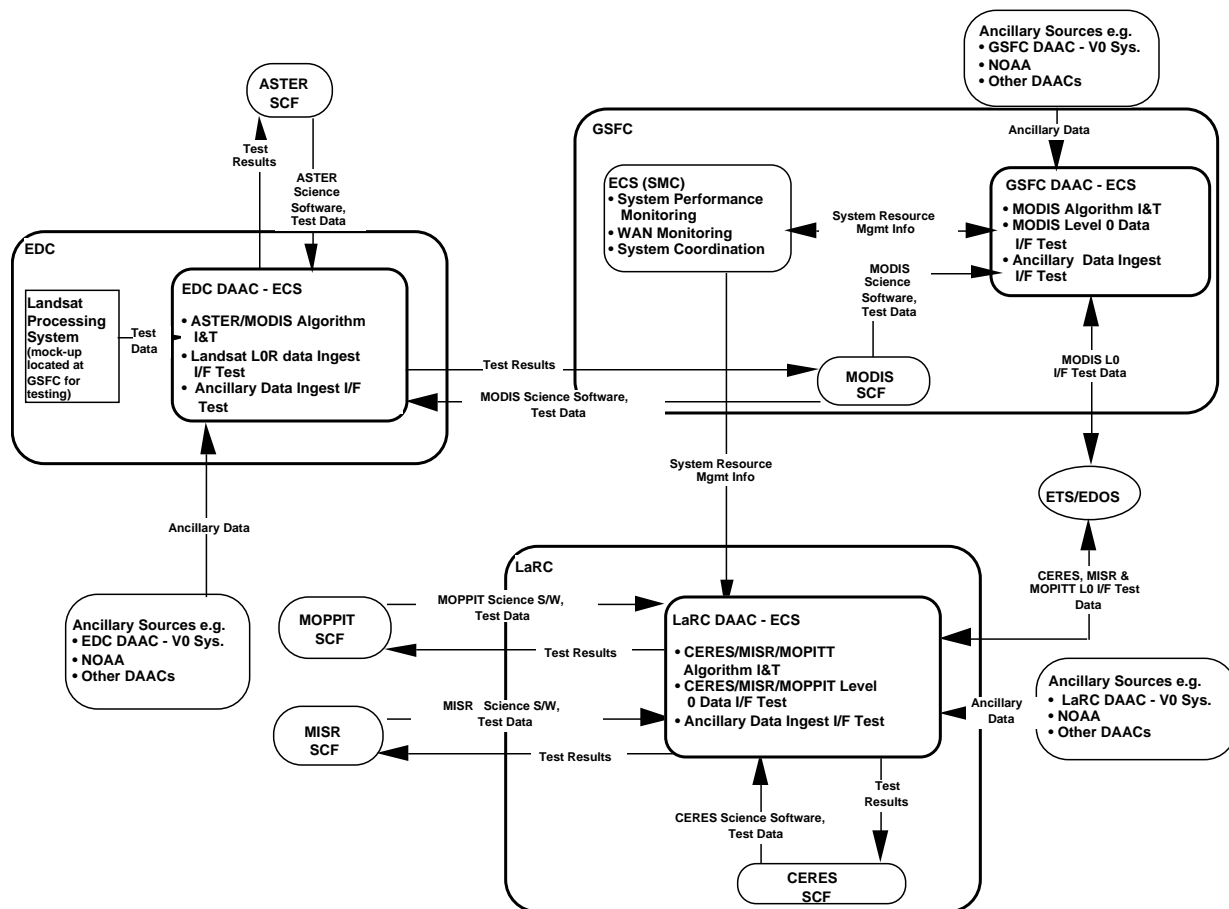


Figure 3-3. Release A Landsat-7 and AM-1 Key Interfaces

3.3 Acceptance Test Roles and Responsibilities

Acceptance testing is a formal process that requires the coordination of different organizations. Each organization has well defined roles and responsibilities for the acceptance testing process:

Independent Acceptance Test Organization (IATO): The IATO assigns a test manager to coordinate and run acceptance testing. The IATO also provides test conductors to execute the step-by-step procedures that are defined in the ATPr. Test conductors also write, collect, and track nonconformance reports and determine the impact of these reports on test plans, scenarios, test cases, and procedures.

Quality Office (QO): The QO provides a representative to witness the execution of acceptance testing. The QO also tracks the status of nonconformance reports and reviews them prior to closure to ensure that the required actions have been completed.

Configuration and Data Management Organization: The Configuration Management Office (CMO) coordinates with the IATO to capture the test configuration of software, hardware, test data, test tools, and documentation prior to test execution to ensure repeatability. They also capture and retain test outputs (e.g., test logs, data, and modified procedures) and distribute copies for test analysis. The product baseline, which is established prior to the RRR and includes test reports, is maintained by the CMO.

ECS Maintenance & Operations (M&O) Organization: As part of acceptance testing at the test site, the site manager assigns M&O personnel who are integrated into the test team to help execute acceptance tests. The early first-hand involvement of the site manager and his operations personnel in site acceptance testing provides the M&O Team with early visibility into each new release and hastens a smooth transition. This involvement and familiarity with ECS software in the stages before release to the user base greatly enhance the effectiveness and productivity of the M&O staff and positions a highly competent and responsive user support staff on-site at the DAACs. In addition, during the M&O phase, the IATO assists by providing benchmark tests to verify operational performance of the ECS system. The IATO provides guidance in acceptance testing during the verification of approved changes and enhancements.

ESDIS SI&T Contractor: The ESDIS Integration Contractor and the Independent Verification and Validation (IV&V) Contractor witness and monitors acceptance testing, as directed by the ESDIS SI&T, and the IV&V Contractor.

The Acceptance Test Team (ATT) consists of various personnel who assist the IATO Test Conductor during the acceptance testing phases. Listed below are the DAAC role players and a brief description of their responsibilities.

DAAC M&O Staff: Performs maintenance and operations activities, including hardware installations.

Network Analyst (NA): Performs network functions, including monitoring the network's performance and integrity.

Performance Manager (PM): Addresses system performance issues and concerns.

Resource Manager (RM): Manages ECS site resources.

System Administrator (SA): Performs overall system maintenance, including system backups and software upgrades.

Data Pull Technician: Manages ingest, pull and processing activities. (DAAC)

Production Planner: Populates and maintains the production planning database. (DAAC)

Production Scheduler: Reviews, approves and activates the daily production schedule. (DAAC)

Data Ingest Technician: Oversees ingest activities including the handling of physical media (e.g., mounting tapes) from which input data are read. Responsibilities also includes verifying that all data reported on data availability schedules, product delivery notices, etc. are received, validated, accounted for, and archived. (DAAC)

Data Distribution Technician: Oversees distribution activities including handling of physical media (e.g., mounting tapes) onto which ECS data are written. (DAAC)

Science Software Integration Test Team (SSITT): Verifies that any and all updates to science software are thoroughly tested and verified before being permanently installed at the DAACs.

Listed below are the EOC role players and a brief description of their responsibilities.

Flight Operations Team (FOT): Executes activities performed at the EOC workstations including system initialization, scheduling, commanding, telemetry, and analysis activities. This teams consists of the FOT Planner/Scheduler, FOT Operations Coordinator, FOT Spacecraft Activity Controller, FOT Spacecraft Evaluator, and FOT Instrument Evaluator. Listed below is a brief description of responsibilities.

FOT Planner/Scheduler -- Performs spacecraft and instrument command loading and schedule generation. This includes receiving planning and scheduling requests, instrument microprocessor memory loads, and command activity definitions from the Instrument Operations Teams (IOTs).

FOT Operations Coordinator -- Coordinates operational tests and deliveries of FOS software and the project database.

FOT Spacecraft Activity Controller -- Responsible for EOC ground system elements, hardware, software, communications links, command capability, and Local Site Manager (LSM) functions. This includes controlling and verifying ground script execution, verifying commands and load contents, transmitting and verifying commands and load uplinks, and monitoring ground system performance.

FOT Operations Controller -- Responsible for real-time interface coordination, approving real-time command uplinks, and resolving real-time anomalies.

FOT Spacecraft Evaluator -- Monitors spacecraft subsystems during real-time operations and assists in spacecraft trend analysis and anomaly recognition and resolution. This includes reviewing spacecraft activity logs and monitoring ground script execution, spacecraft command activity, and spacecraft health and safety.

FOT Instrument Evaluator -- Monitors and analyzes instruments during real-time operations and assists in instrument trend analysis and anomaly recognition and resolution. This includes reviewing activity logs and monitoring ground script execution, instrument command activity, and instrument health and safety.

FOT Database Manager -- Responsible for database administration of the project database and operational data files (ODFs), maintaining data base access, validating user access/privileges, and investigating/documenting violations.

Instrument Operations Team (IOT) -- Executes activities performed at the CERES, MISR, MODIS, MOPITT and ASTER instrument workstations. This team consists of the IOT Planner/Scheduler and IOT Instrument Evaluator. These positions are not necessarily the actual positions utilized at Instrument Support Terminals (ISTs), but rather they represent the two major FOS-related roles accomplished at ISTs.

IOT Planner/Scheduler -- Provides the FOT with planning and scheduling requests, instrument microprocessor memory loads, and command activity definitions.

IOT Instrument Evaluator -- Performs real-time instrument command and telemetry monitoring and analysis. Responsible for instrument anomaly detection and contingency procedure execution, instrument command load validation, and instrument performance and trend analysis.

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4. Test Tools

This section identifies and describes the test tools (COTS and custom coded software) used in the execution of the Release A ECS Acceptance Test and the generation of data sets. The tools for requirements traceability, computer aided software test and performance, configuration management, network status and monitoring, and external interface simulators are discussed below. Table 4-1 summarizes the test tool suite available for Release A acceptance tests. Figure 4-1 shows the test tool categories used to exercise Release A acceptance tests.

Table 4-1. Release A Test Tool Descriptions

TYPE	TOOL	DESCRIPTION
Requirements Traceability Tool	RTM	The Requirements and Traceability Management tool provides an audit trail that enables multiple requirements to be traced.
Capture and Playback Tool	XRunner	XRunner is an automated software testing system for X window applications. XRunner automates the full range of software testing needs. Some of the gained functionality includes: output synchronization, text recognition, and a high-level testing mode that operates directly on GUI objects.
Automated Client/Server Testing System	Load Runner	LoadRunner is an automated testing system for client/server applications on UNIX/X platforms. By running multiple users in parallel off the server, LoadRunner enables the automation of load testing, performance testing, and system tuning.
Configuration Management Tool	Clear Case	Clear Case uses Version Object Base (VOB) to store the software versions. A VOB is a virtual directory tree of sources and other objects that is mounted like a disk partition. A project may have many VOBs. Any changes made by the developer after the software has been frozen will be conducted on a branch. The test organizations are responsible for merging the fixes (branches).
Nonconformance Reporting and Corrective Action Tool	DDTS	DDTS is a UNIX change management and bug tracking system that racks and manages changes throughout the life cycle of a hardware or software product from initial requirements planning to obsolescence in the field. DDTS works in conjunction with ClearCase.
Network Management Framework	HP Open View	HP OpenView is used to monitor any device that supports the Simple Network Management Protocol (SNMP). This tool will aid us in determining the status of the network and the devices on the network.
Network Analyzer/Monitor	Network Analyzer/ Sniffer	The Sniffer Network Analyzer assist in performance testing and monitors and generates traffic on Ethernet and FDDI networks.
Network Performance Tool	Netperf	Netperf is a benchmark tool which measures various aspects of network performance, primarily focusing on bulk data transfer and request/response performance using either the TCP or UDP and the Berkeley Sockets interface.
Source Simulator	TRMM/ TSDIS I/F Simulator	The TRMM I/F Simulator provides the basic protocol and interface functions employed by the SDPF/TSDIS.
EOSDIS Test System	ETS	ETS provides the capabilities to simulate EOS AM-1 spacecraft and instrument low rate telemetry data and high rate science data for the EOC and DAACs. The ETS also simulates the EDOS interface with the ECS.

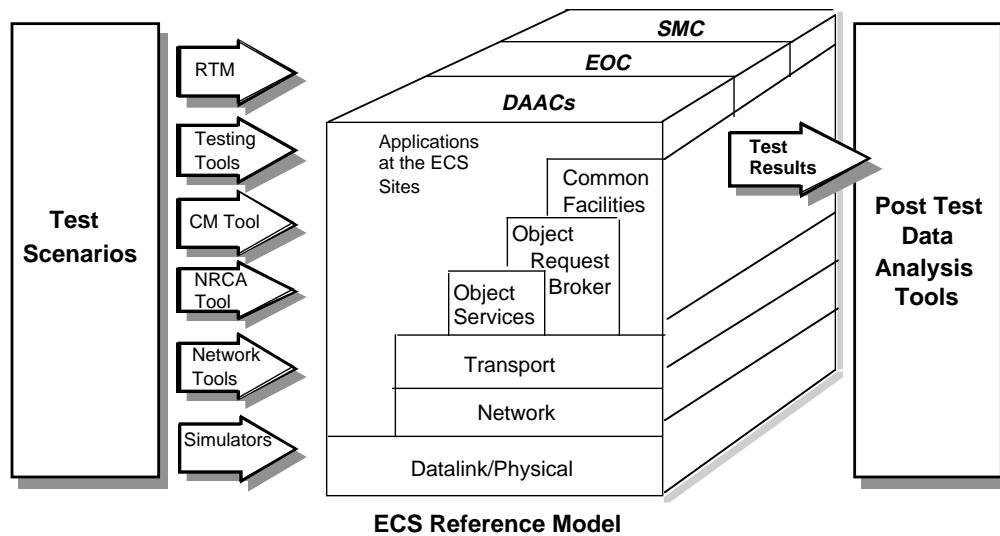


Figure 4-1. Release A Test Tool Integration

4.1 Requirements Traceability

The Requirements and Traceability Management (RTM) tools provides an audit trail for ECS requirements. This data dictionary provides definitions of classes and attributes in RTM database. Figure 4-2 depicts the RTM Class Definition and Table 4-2 provides a definition of each class.

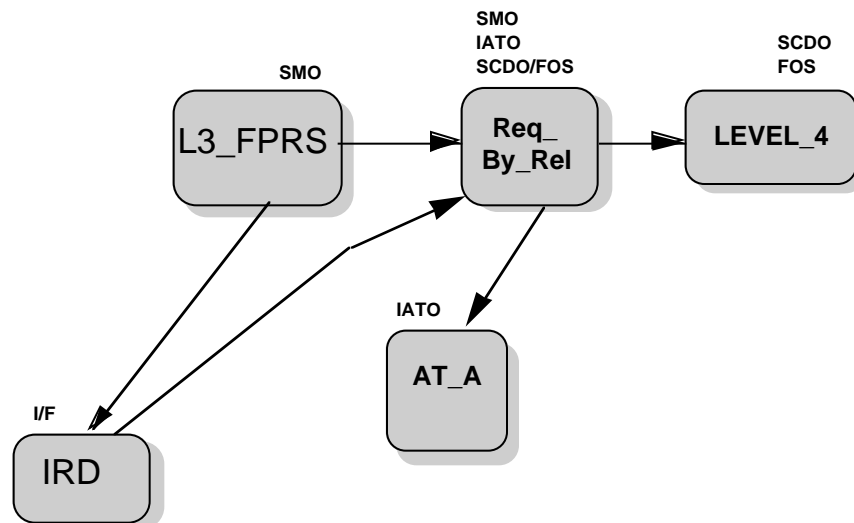


Figure 4-2. RTM Classes

Table 4-2. RTM Class Definitions

CLASS	DEFINITION
L3_FPRS	Contains the Level 3, Functional and Performance Requirements Specifications received from GSFC 07/94 (423-41-02). Objects in this class can be mapped to objects in LEVEL_2, IRD, itself, and REQ_BY_REL classes. All relationships are defined as many-to-many relationship.
REQ_BY_REL	Contains requirements allocated for each formal release and are expanded from L3_FPRS and IRD classes. It is used by development engineers to develop the Level 4 requirements. Objects in this class are mapped to objects in LEVEL_4, CCR, IRD, L3_FPRS, AT_A, AT_B, IT_Ir1, IT_A, IT_B, and IT_FOS classes. All relationships are defined as many-to-many relationships.
LEVEL_4	Contains Level 4 requirements which were expanded from the REQ_BY_REL class. Objects in this class are mapped to objects in REQ_BY_REL, IT_FOS, IT_A, IT_Ir1, IT_B, COTS, CCR, and COMPONENT classes. All relationships are defined as many-to-many relationship.
AT_A	Contains the system acceptance test sequences and test cases for A as identified in Acceptance Test Plan (ATP) and Acceptance Test Procedures. Objects in this class are mapped to objects in REQ_BY_REL class. Relationship between two classes is defined as many-to-many relationship.
IRD	Contains external interface requirements specified in Interface Requirements Documents (IRDs). Objects in this class are mapped to objects in L3_FPRS, CCR, and REQ_BY_REL classes. All relationships between classes are defined as many-to-many relationship.

4.2 Computer Aided Software Test and Performance Tools

The Mercury XRunner and LoadRunner are computer aided software test and performance test tools used to assist in the automation of testing. XRunner is designed to automate the test process by capturing, in a script file, keyboard, mouse input and system under test (SUT) responses, and then playing back those inputs and comparing the results to those stored in an expected results directory. LoadRunner is used to simulate a large number of actual users, in order to measure the response time of a server in a client/server application. Both tools offer sophisticated programming capabilities through a C based language called Test Script Language (TSL), that can be used to drive the system under test much more extensively than would be possible with manual testing. It also offers the virtue of repeating the test sequence with fidelity. The XRunner and LoadRunner tools also provide very reliable playback of user input. Specific usage of XRunner and LoadRunner in ECS acceptance tests are discussed below.

4.2.1 XRunner Usage

The primary use of the XRunner tool is the automation of functional tests that involve heavy use of graphical user interfaces. Examples of such user interfaces are the Release A desktop Graphical User Interface (GUI), DAAC or SMC operator screens, and EOC operator screens.

4.2.2 LoadRunner Usage

LoadRunner is utilized for all response time testing that involves the Release A desktop GUI and during End-to-End tests that involve large numbers of test and operations personnel at multiple sites.

4.2.3 Test Execution Reports

Upon completion of a test script execution, both XRunner and LoadRunner automatically generate test execution reports. LoadRunner generates performance graphs for analysis.

4.3 Configuration Management Tools

The ECS Configuration Management Organization (CMO) is responsible for the management and control of the Software Development Library (SDL), the Non-Conformance Reporting and Corrective Action (NRCA) System, and the baseline configuration management of hardware and software. The CMO uses two software tools to support its effort: ClearCase and Distributed Defect Tracking System (DDTS).

4.3.1 ClearCase

The CMO utilizes ClearCase to manage and control the SDL which is the central repository for ECS software including test verification items. ClearCase, an automated software tracking tool, manages multiple versions of evolving software components; tracks which versions were used in software builds; performs builds of individual programs or entire releases according to user defined version specifications; and enforces site-specific development policies. ClearCase scripts are provided by CMO to be used throughout the software development life cycle in order to standardize and automate the tracking of the information in the SDL. The project instruction PI CM-1-019 Software Development Library, describes the SDL, the role of ClearCase in the SDL, and the associated ClearCase scripts.

The following test items are stored and baselined by the CMO, via the Software Turnover Process, as they are finalized.

- Verification documents, including test plans, procedures, scripts, and reports.
- Test data sets, software and hardware configuration, including test tools.
- Unit-tested components, data sets, Segment hardware configuration, and COTS software, as described in COTS Process Model, PI SD-1-013.
- Verified Segment/element threads and builds.
- Verified system builds
- Integration system build for a release.
- Evaluation of test results

The items are retrieved from the SDL, via ClearCase when required to perform various verification activities at the sites.

The ECS policies and procedures for baselining test items and retrieving test items from CMO is defined in PI CM-1-025, Software Development Handbook.

Since Acceptance Testing of the ECS is conducted within a baselined configured environment, ClearCase is installed at each test site; and CMO electronically deploys the binary files (executable) of ECS software, at each test site, from the ECS Development Facility (EDF). In order to maintain the integrity of the test script and test data, CMO deploys IATO's test scripts and test data, in the same manner they deploy ECS binary files. This allows the Acceptance Tester, at each test site, to maintain a baseline of changes to the test script and/or test data for the purpose of work around.

4.3.2 Distributed Defect Tracking System (DDTS)

The DDTS is a software tool used to support the NRCA system for the CMO. The DDTS records nonconformance's and reflects the progress of nonconformance Reports through resolution and captures necessary information to document that progress. Through the production of management reports, DDTS provides management visibility and metrics to insure that NCRs are being worked in a timely and effective manner. The policies and procedures governing the usage of DDTS on ECS are defined in the Non-Conformance Reporting project instruction (PI), SD-1-014.

The NRCA system is the process for identifying, investigating, and resolving problems with the ECS during development, integration, installation, and acceptance test. To facilitate disposition and resolution of problems, the NRCA system and its processes emphasize tracking of responsibility, effective communication and delegation of authority. The NRCA system utilizes the DDTS to record and track software nonconformances. DDTS is customized by ECS to accurately reflect the progress of NCRs through resolution and captures necessary information to document that progress. Through the production of management reports, DDTS provides management visibility and metrics to insure that NCRs are being worked in a timely and effective manner.

4.4 Network Status and Monitoring

The three network tools utilized in acceptance tests are the HP OpenView, Sniffer Network Analyzer, and Netperf. Each are described below.

4.4.1 HP OpenView

The HP OpenView is network tool which monitors and controls the entire network environment at each ECS site. As a diagnostic tool, it has the capability to isolate faults quickly. The tool, which resides on the Local System Management (LSM) at each ECS test site, allows the user to display a map of the network environment at that local site for the LSM and the maps of all sites at the SMC. These maps are real-time interactive graphical representations which allow the user to detect network problems as they occur without having to update or refresh the display screen, and to diagnose network connectivity. The tool allows the user to create submaps of the map which can be as small as a software component on the system. The Acceptance Test Team (ATT) utilizes this tool to introduce systems and/or network faults to the system.

4.4.2 Network Analyzer/Sniffer

The Network Analyzer/Sniffer is a performance testing tool which monitors and generates traffic on Ethernet and FDDI networks.

4.4.3 Netperf

Netperf is a benchmark tool which measures various aspects of network performance. Its primary focus is on bulk data transfer and request/response performance using either the TCP or UDP and the Berkeley Sockets interface.

4.5 External Interface Simulators

External interface simulators are used during acceptance testing when the real interfacing system is not available. For Release A, the simulators used for acceptance testing are described below.

4.5.1 TRMM Simulator (TRMMSIM)

The TRMM Simulator (TRMMSIM) is a subsystem of the DDF External Simulator (DESIM). The TRMMSIM provides the capability to test the ECS ability to ingest data from TSDIS and Pacor II (SDPF), and to send data to TSDIS. In order to perform these two tasks, the simulator consists of a consume part and a source part. The consume part of the simulator provides the capability to send a DAN and its associated data to, and receive a DAN and its associated data from an ECS DAAC.

The TRMMSIM operates in two modes, interactive and non-interactive. The interactive mode allows the user to modify and send message types (Authentication Response, DRVR, DDN, and DDA). This mode is useful when testing the interface for error handling. The non-interactive mode generates and sends the appropriate message type.

4.5.2 EOSDIS Test System (ETS)

The ETS is primarily designed to support ECS Release B and EOS Ground System (EGS) testing. For Release A, pending availability, the Low Rate System and the Multimode Portable Simulator is used for EOC testing. In this configuration, ETS provides simulated telemetry data.

4.6 Test Data

A variety of test data is required to exercise the Release A system at each site. This test data will be used in conjunction with the simulators described above to stimulate the system. Table 4-3 summarizes the missions, data sources and destinations and content required for Release A testing. Each of the site specific volumes contains detailed lists of test data sets.

Real test data provided by the instrument teams is used whenever possible. In situations where real data is not available, simulated data or similar heritage data is used for testing. The test data is validated and placed under configuration control prior to test execution.

Table 4-3. Release A Data Sources, Destination, and Data Content (1 of 2)

Mission	Source	Destination	Data Content	Test Data Source/Contact
AM-1	Aster GDS	ECS at the EDC DAAC	Algorithms; Level-1A&1B Data; Expedited Products; Product Status; and User Data Search&Order Dialog.	ESDIS Test Data Working Group
AM-1	Aster GDS	SMC at GSFC	Schedule; and Status Information.	ESDIS Test Data Working Group
AM-1	Aster GDS	EOC	Planning; Scheduling.	ESDIS Test Data Working Group
AM-1	EDOS	EOC	Real-Time Telemetry and Accounting.	ETS/GTSIM
AM-1	EDOS	ECS at the GSFC DAAC	Level-0;Expedited Telemetry, Status; and Coordination Data.	ETS/ESDIS Test Data Working Group
AM-1	EDOS	ECS at the LaRC DAAC	Level-0;Expedited Telemetry, Status; and Coordination Data.	ETS/ESDIS Test Data Working Group
AM-1	EDOS	ECS at the EDC DAAC	Level-0;Expedited Telemetry, Status; and Coordination Data.	ETS/ESDIS Test Data Working Group
AM-1	EDOS	SMC at GSFC	Status; and Coordination Data.	ETS/ESDIS Test Data Working Group
AM-1	FDF	EOC	Basic Connectivity Test Messages	TICTOC/FDF ENGINEERING ORG
AM-1	FDF	ECS at the LaRC DAAC	Repaired & Refined Orbit and Attitude Information.	TICTOC/FDF ENGINEERING ORG
AM-1	FDF	ECS at the EDC DAAC	Repaired & Refined Orbit and Attitude Information.	TICTOC/FDF ENGINEERING ORG
AM-1	FDF	ECS at the GSFC DAAC	Repaired & Refined Orbit and Attitude Information.	TICTOC/FDF ENGINEERING ORG
Landsat-7	Landsat LPS	ECS at the EDC DAAC	Directory & Guide Information; Level-0R Data.	VO DAACS
AM-1	NCC	EOC	Ground Configuration Messages	NCC Test System
TRMM	NOAA ADC	ECS at the GSFC DAAC	Ancillary and Correlative Data	Currently V0 DAACS
Mission	Source	Destination	Data Content	Test Data Source/Contact
TRMM	NOAA ADC	ECS at the LaRC DAAC	Ancillary and Correlative Data.	Currently VO DAACS
TRMM	NOAA ADC	ECS at the EDC DAAC	Ancillary and Correlative Data.	Currently VO DAACS
AM-1	SCF	EOC	Instrument software loads.	ESDIS Test Data Working Group
AM-1	SCFs	ECS at the GSFC DAAC	Algorithms.	ESDIS Test Data Working Group
AM-1	SCFs	ECS at the LaRC DAAC	Algorithms.	ESDIS Test Data Working Group
AM-1	SCFs	ECS at the EDC DAAC	Algorithms, LANDSAT L0R Data	ESDIS Test Data Working Group
AM-1	SCFs	ECS at the LaRC DAAC	CERES higher level products	ESDIS Test Data Working Group

Table 4-3. Release A Data Sources, Destination, and Data Content (2 of 2)

Mission	Source	Destination	Data Content	Test Data Source/Contact
TRMM	SDPF	ECS at the LaRC DAAC	CERES Level-0, Housekeeping, Expedited Telemetry and Definitive Orbit Data.	ESDIS Test Data Working Group
TRMM	TSDIS	SMC at GSFC	Schedule Coordination & Adjudication for Data Exchange with DAACs; and Status Information	Internally Generated
TRMM	TSDIS	ECS at the GSFC DAAC	PR and TMI Level-1A through Level-3 Data Products; GV Data; Request For Ancillary/Correlative Data; and TRMM Product Delivery Schedules.	ESDIS via TRMM Project
TRMM	TSDIS	ECS at the GSFC DAAC	VIRS Level-1A through Level-3 Data Products; Request For Ancillary/Correlative Data; and TRMM Product Delivery Schedules.	ESDIS via TRMM Project
All Missions	Version-0 DAACs	ECS at the GSFC DAAC	Inter DAAC and Cross DAAC Communications; Inter-Operability; and Data Transfer.	VO DAACS
All Missions	Version-0 DAACs	ECS at the LaRC DAAC	Inter DAAC and Cross DAAC Communications; Inter-Operability; and Data Transfer.	VO DAACS
All Missions	Version-0 DAACs	ECS at the EDC DAAC	Inter DAAC and Cross DAAC Communications; Inter-Operability; and Data Transfer.	VO DAACS

5. Test Execution and Coordination

This section describes the process by which formal acceptance testing is managed at the site on a daily basis. The responsibilities of the test manager and test engineers are also described.

5.1 Acceptance Test Planning

Acceptance test planning is formally presented in the Verification Plan (DID 401/VE1), the Acceptance Testing Management Plan (DID 415/VE1) and the Acceptance Test Plan (DID 409/VE1). Both the ATP and ATPr documents reference the requirements verification matrix contained in the Verification Specification (DID 403/VE1). Contents of the Verification Specification are, in turn, imported from the requirements matrix data base maintained by the RTM tool. The Configuration Management activities related to transferring software code is described in the ECS Configuration Management Plan (DID 102/MG1) and the Configuration Management Procedures (DID 103/MG3).

Volumes 1-5 of the ECS System Acceptance Test Procedures provides the detailed test procedures for each site. Appendix E provides the template and data field descriptions for the test procedures format used in these sections. The sequence of activities that lead up to the completion of the Release A acceptance testing is shown in Figure 5-1. It shows the series of acceptance test activities that take place, how they relate to the major ECS reviews, and their relationship with the documents produced. It also shows the activities and their relationships with the System I&T, and Operations Phases of the Release A acceptance testing life cycle.

5.2 Acceptance Test Preparation

The initial activities of acceptance test preparation are conducted at the ECS Development Facility (EDF). First, an inventory of the resources needed to perform acceptance tests is taken. Items inventoried include test input data, automated test tools, and technical documentation. If any required items are found to be missing or insufficient for acceptance test performance, corrective action is taken. Prior to CSR, walk-throughs of the entire Acceptance Test Procedure are conducted at the EDF to ensure proper format, contents, and completeness of the test scenarios and test plan. Additionally, concurrent with the execution of I&T, critical acceptance test sequences and test cases are executed by IATO against the I&T baseline to ensure that any major problems with either the Release, or the Acceptance Test Procedures and resources, are found at the EDF. During the EDF test activities, discrepancies are documented as NCRs. NCRs written during this time frame are controlled by the Release A CCB.

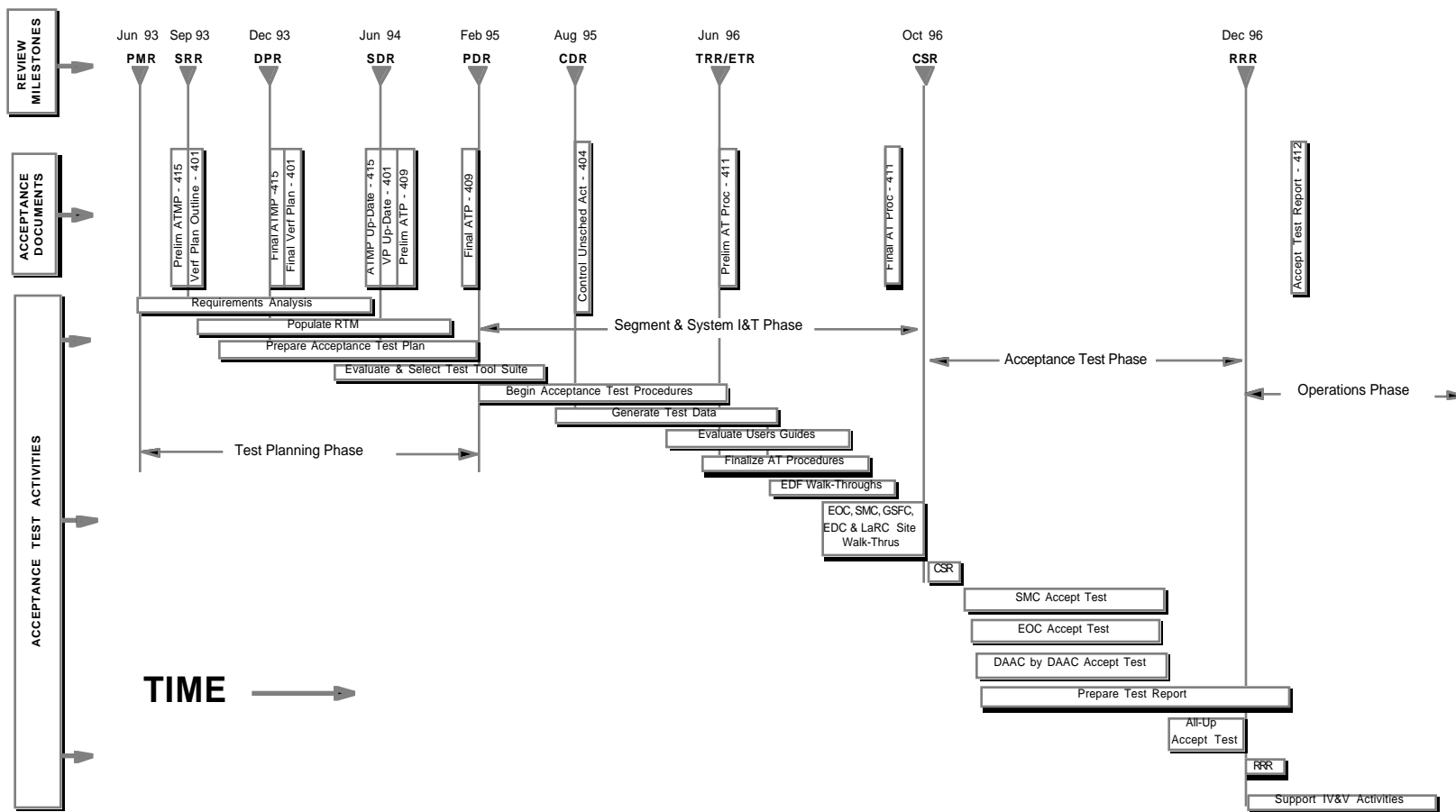


Figure 5-1. Release A Acceptance Test Life Cycle

5.2.1 Software Pre-Install

Approximately 30 days prior to CSR, an ECS software pre-installation is performed at the applicable operational sites. The software used is a snapshot to the ECS system undergoing final system integration at the EDF. The pre-install serves as a pathfinder for the install of the formal delivery occurring after CSR. The activity is led by a development organization team consisting of developers and system I&T. Support is provided by configuration management and acceptance testing personnel, assisted by the M&O personnel already on site. A critical function of the pre install is to perform the DAAC specific configuration of the ECS, such as verifying network addressing, enabling DAAC-unique functions, and tailoring COTS configuration files.

Discrepancies observed during the software pre-install are formally filed as NCRs. Changes to site-specific configuration files formulated as a result of pre-install are forwarded to the EDF for incorporation into the formal baseline. The formal installation of the release is accomplished at the sites immediately following CSR to support acceptance test implementation.

5.2.2 Release A Acceptance Test Readiness Reviews

In conjunction with CSR, Acceptance Test Readiness Reviews (ATRRs) are conducted at the applicable operational sites by the ECS Maintenance and Operations (M&O) organization. During this time, each site's readiness to receive Release A is assessed. The ATRR assesses plans for software installation and for conducting Acceptance Tests in parallel with on-going site operations.

5.2.3 Release A Consent to Ship Review

Before the shipment of ECS Release A to the operational sites, a CSR is held to address the readiness of the release for delivery to the operational sites for testing. The purpose of the CSR is to:

- Review the results of integration and test activities
- Review the approach for installation and test of the release at the operational sites to ensure that disruptions to ongoing operational services are minimal or nonexistent
- Review the status of test procedures for operational system integration and acceptance testing
- Determine the readiness of the equipment and staff at the operational sites for release installation

The CSR includes a review of the software pre-installs at the operational sites, and the acceptance test preparation activities at the EDF. CSR review items include:

- DID 324/405-I&T Report (preliminary)
- DID 411-Acceptance Test Procedures
- DID 512-Maintainability Demonstration Test Plan

- DID 521-CSR Tabulation of Non-conformance Reports
- DID 603-Operation Readiness Plan
- DID 609-Operations' Reference Manual
- DID 611-Mission Operations Procedures
- DID 625-Training Material

Based on the CSR presentation and the delivered CDRL documents, a recommendation is made to ESDIS to accept or reject Release A. ESDIS makes the formal decision to ship or not to ship the release.

5.3 Acceptance Test Implementation

Following a successful CSR, Release A is formally installed at the applicable operational sites. The formal installation replaces the pre-installation efforts. The formal installation of Release A includes custom code and commercial-off-the-shelf (COTS) software and, as applicable, executables, load modules, test data sets, test tools, and documentation. The formal installation at the operational sites is performed by the I&T organization, supported by the CMO and the M&O organization.

Prior to the execution of test scenarios at the test sites, three final checks are performed. The first check consists of a survey of the operational sites where the release is to be tested. This pre-test site check is to provide confidence that each operational site is properly configured for formal acceptance testing. The next pre-test check consists of performing a selected set of test cases from Ir1 to ensure that existing operations at the site are not adversely affected by the installation of the new release. The final check consists of a walk-through of the entire set of acceptance test procedures to ensure site compatibility for the release. In the event that any discrepancies are observed during these three checks, the discrepancies are filed as NCRs in the NRCA system.

5.4 Test Execution and Error Handling

When the final checks have been successfully executed the actual commencement of the formal acceptance test are coordinated with the Site Manager by the Test Manager. All acceptance tests are conducted under the direction of the Test Manager who has absolute authority regarding all aspects of the execution of the acceptance test. This authority includes the assignment of priority to NCR's and their disposition and impact on ongoing testing. This authority may be delegated by the Test Manager to the Test Conductor at specific times such as absences from the sites or off shifts hours. For additional information concerning duties of other acceptance test participants, see the Verification Plan (DID 401/VE1).

At each test site, site-specific and all up test phases are executed. The site-specific test focuses on each individual site, and the all-up test phase includes all sites and elements testing simultaneously. At each site, the final scenario to be executed is an acceptance test demonstration, which exercises a comprehensive sequence of events verifying the overall site-specific and ECS-wide capabilities of the release.

In unusual circumstances, where there is an unscheduled interruption in the execution of a planned Acceptance Test session, the Procedures For Control of Unscheduled Activities During Verification for the ECS Project (DID 404/VE2) may be invoked. This document describes the process used to resolve unplanned activities during the verification process.

5.4.1 Non-Conformance Reporting

Discrepancies observed during Acceptance Testing are filed as NCRs and entered into the NRCA system for disposition by the Release A CCB. If the CCB determines that modifications are necessary, the software is returned to the developers for correction. After the NCRs are corrected and test criteria have been met, the results are reported to the Release A CCB. The Release A CCB authorizes or rejects delivery of the software fixes to the operational sites. Figure 5-2 graphically depicts the NCR process throughout the acceptance test phase. Figure 5-3 provide sample reports available from the NRCA system.

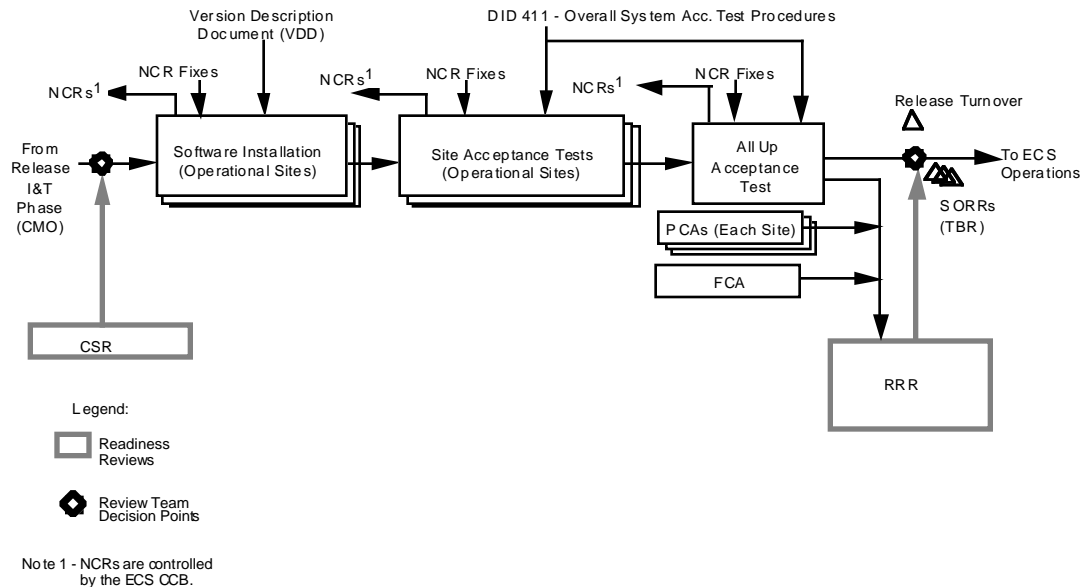


Figure 5-2. Acceptance Test NCR Process

Total Problems by Severity		Unresolved Problems	
Severity 1	25 (17%)	Severity 1	0
Severity 2	35 (24%)	Severity 2	0
Severity 3	48 (33%)	Severity 3	0
Severity 4	23 (16%)	Severity 4	0
Severity 5	15 (10%)	Severity 5	0
TOTAL	146	TOTAL	0

Total Problems by State	
New	0 (0%)
Assign-Eval	0 (0%)
Assign-Fix	0 (0%)
Fixed	0 (0%)
Assign-Verify	0 (0%)
Verified	0 (0%)
Closed	142 (97%)
Duplicate	4 (3%)
TOTAL	146

Figure 5-3. NRCA System Sample Reports

5.4.2 Acceptance Test Delays

As acceptance testing continues, the severity and number of unresolved NCRs are monitored on a daily basis, and compared with the established acceptance test criteria. As circumstances dictate, it may be necessary to halt testing based on the number and severity of open NCRs and resume testing when they have been corrected and incorporated in a new test version. Table 5-2 describes the discrepancy classification and priority scheme. Also, when an NCR documents an instance that impedes further testing, acceptance testing may be halted at the discretion of the Test Manager. In such cases, the release is returned to the responsible development organizations.

Table 5-1. Discrepancy Classification and Priority

Classification	Description
Severity 1	Catastrophic bug without work around that causes total failure or unrecoverable data loss.
Severity 2	Bug which severely impairs functionality. Work around might exist but is unsatisfactory.
Severity 3	Bug that causes failure of non critical system aspects. There is a reasonably satisfactory work around.
Severity 4	Bug of minor significance. Work around exists or, if not, the impairment is slight.
Severity 5	Very minor defect. Work around exists or the problem can be ignored.

CM tracks the product changes and revisions that result from correcting nonconformances. The revised version is returned to the test site. The acceptance test conductor then retests the new version using the scenarios that uncovered the original discrepancy to determine if the nonconformance was corrected. In addition, some regression testing may be conducted to make sure that the fix has not adversely affected other functions previously tested.

5.4.3 Discrepancies At Other Sites

As the acceptance testing proceeds from site to site, discrepancies may be uncovered which were not observed during tests at previous sites. If the mitigation of these discrepancies requires the generation of a new release version, retesting of the new version at each site is conducted during the all-up ECS acceptance test. Additional information on testing during verification is found in the Procedures for Control of Unscheduled Activities During Verification (DID 404-CD-001-001).

5.4.4 Physical Configuration Audits

The objective of the Physical Configuration Audits (PCAs) is to verify at each operational site that the “as-built” Release conforms to its design documentation. The PCA includes a detailed audit of engineering drawings, specifications, technical data for hardware; and a detailed audit of design documentation, listings, and manuals for software. The PCAs are conducted by an ECS Project team lead by CMO, and witnessed, at their option, by the ECS Project Quality Office (QO) and ESDIS. The results are presented at the Release Readiness Review (RRR) and documented in DID 506, Audit Reports. Approval of the Release A PCAs by ESDIS establishes the formal Product Baseline for Release A.

5.4.5 Functional Configuration Audit

The objective of the Functional Configuration Audit (FCA) is to verify that Release A’s actual performance complies with its requirements and interface specifications. FCAs for Release A are satisfied by an inspection of the Acceptance Test results and are conducted by an ECS Project team led by CMO. The FCA activities are witnessed, at their option, by the ECS Project Quality Office (QO) and ESDIS. The results are presented at the Release Readiness Review (RRR) and documented in DID 506, Audit Reports.

5.4.6 Release Readiness Review (RRR)

After testing is complete, the IATO leads the Release Readiness Review (RRR) and reports on the results of the Release Acceptance Test to the ESDIS review team. The results presented in the RRR provides the basis by which ESDIS determines if the release is ready to proceed to IV&V operations. The ECS System Acceptance Test Report (DID 412/VE2) and the Acceptance Data Package (DID 535/PA1) are delivered to the Government four weeks after RRR to provide detailed test results, their analysis and a summary of open items to be corrected in the next version.

5.5 Test Logs

The test results are logged into the Test Conductor's site test log on a daily basis. Each entry contains the time and date, test procedure number, and results of the test procedure, including NCRs written during the tests. Figure 5-4 is an example of the test log summary used for acceptance tests. Any deviations from the test procedures is recorded in the test logs.

In addition, the actual procedures are marked up to indicate temporary (black or blue ink) and permanent (red ink) changes. Refer to the Procedures For Control of Unscheduled Activities During Verification for the ECS Project (DID 404/VE2) for the detailed process. All procedure markups, test logs, and supporting documentation are included in the formal Test Report to be delivered following RRR.

Sequence:			
Test Procedure Name:			
Test Procedure ID:			
Test Location:		Site:	
S/W Config./ Version:			
H/W Config./ Host Names:			
Test Data:			
Test Tools/ Scripts:			
Test Date:			
Witness(es):			
Comments:		Test Time:	
NCRs Written:			
NCRs Verified:			
NCRs Un-Verified:			
n Pass		Fail	Partial Pass/Fail
1st Run	Formal Run	Retest	Release
Tester Signature(s)		Witness Signature(s):	
_____		_____	
_____		_____	
_____		_____	

Figure 5-4. Test Log Summary

6. Release A Test Schedule

The current plans call for conducting Release A acceptance testing during the two month period following the CSR, which is scheduled to occur October 1, 1996. The plan specifies conducting acceptance tests in three sessions. The first session occurs during the first three week period following CSR at SMC, EOC, GSFC, and LaRC. The second session occurs the following two weeks at EDC, with SMC and EOC remaining involved to participate where mutual testing is required. The final session occurs during the remaining three weeks of the period. During the final three weeks an All-Up End-to-End session occurs with all five sites participating.

6.1 Test Schedule

Figure 6-1 includes the detailed activity schedule for acceptance tests. The detailed test activity schedule for individual site is included in the respective volume.

Several assumptions were made for the overall acceptance test schedule.

- 1) Each test will take approximately 3 hours to execute,
- 2) Work proceeds five days per week, 8 hours/day,
- 3) No more than 2 tests will be ongoing at any one time at each site,
- 4) No problems/failures/delays occur.

These assumptions are validated or adjusted during the various test activities describe in Figure 6-1. As schedule adjustments are made, the details are presented during technical interface and management meetings with both the ECS project personnel and the Government.

The final detailed site schedules are coordinated with each site prior to the conduct of acceptance tests and during site personnel interface meetings. The final schedule includes dates, times and duration for all formal acceptance testing that may occur at each site.

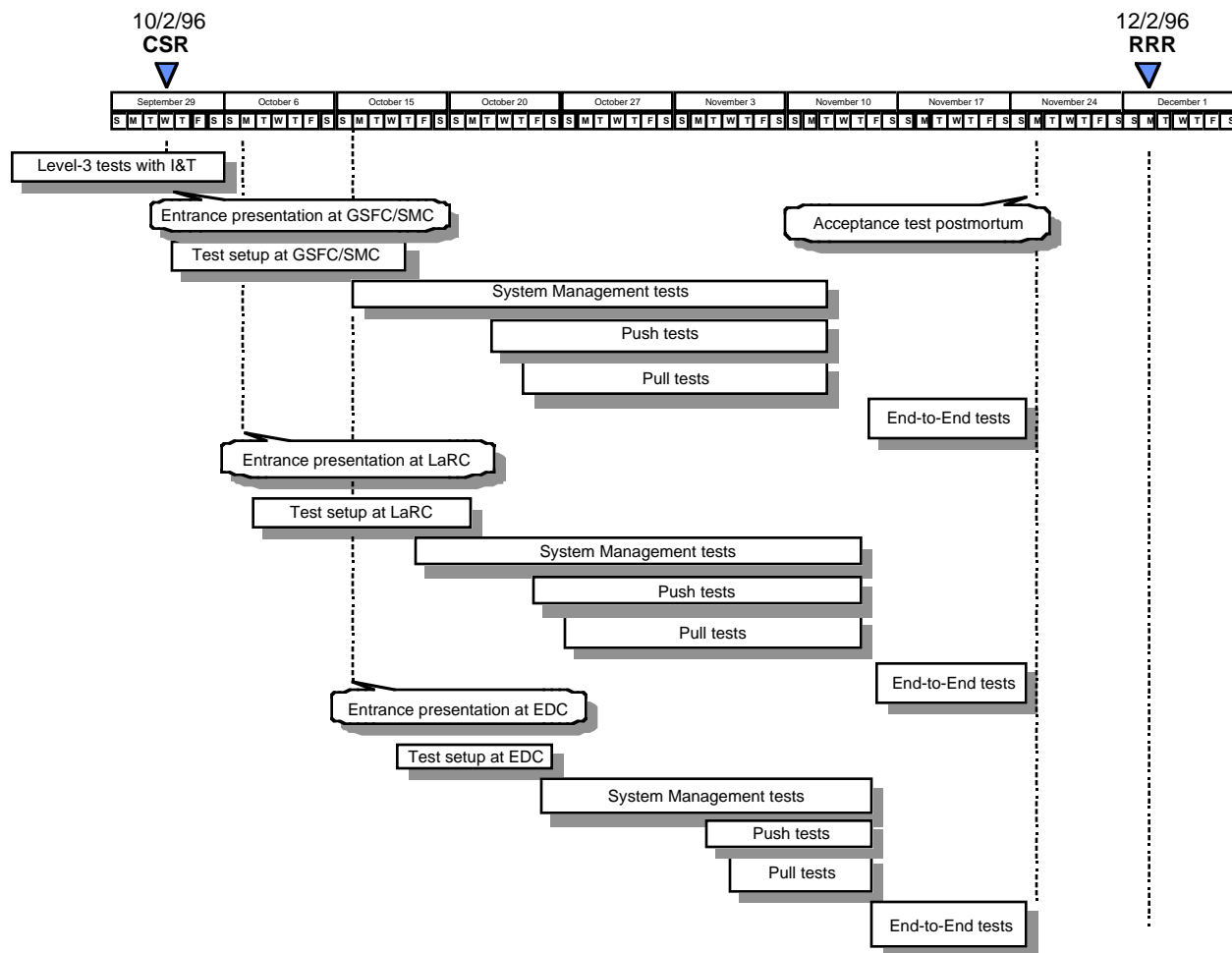


Figure 6-1 Release A Detail Test Activity Schedule

7. Overview

Release A of the ECS provides LaRC with mission and operations functionality to support the TRMM CERES data ingest, production, archive and distribution, AM-1 MISR, and MOPITT science software integration and test, CERES science software updates integration and test, AM-1 interface test support, V0 data migration, archive and distribution, and V0 Interoperability.

7.1 LaRC Release A Functions

The complete set of ECS functions allocated to Release A for the LaRC DAAC are verified to ensure that the release meets those requirements needed to support TRMM and AM-1 mission operations. This includes verifying requirements for all features needed to support the ECS Release objectives for scheduling, data operations, information management and archive, science processing, networks, and system management.

Acceptance tests include the verification of ECS features needed to support TRMM. These features are: CERES science software integration and testing of their Version 1 and Version 2 science software, the ingesting of the TRMM CERES Level 0 data, the ingesting of ancillary data for the TRMM CERES data processing, the TRMM CERES data processing, the scientific quality assurance performed by the CERES science team and the CERES data management team, and the distribution of the CERES data to the science community.

7.2 LaRC Release A Interfaces

Acceptance testing of interfaces for Release A verifies the capability of the ECS to communicate and transfer data over all external interfaces in accordance with the Functional and Performance Requirements Specification (F&PRS) for the ECS and the Interface Requirements Documents (IRDs) associated with each interface. The handling and distribution of these various data sets at the LaRC DAAC involves a number of internal (ECS-to-ECS) and external (ECS-to-non ECS) interfaces.

There are three basic categories of sources providing these data sets to ECS at the LaRC DAAC, including the following:

- External interfaces (i.e., between ECS and a non-ECS system) where both sides of the interface are inside the LaRC.
- External interfaces (i.e., between ECS and a non-ECS system) where ECS is located inside the LaRC DAAC, and the non-ECS system is located outside the LaRC DAAC (e.g., between ECS and NOAA).
- Internal interfaces (i.e., ECS-to-ECS interfaces) where one side of the interface is located inside the LaRC DAAC, and the other side of the interface is located inside a different DAAC (e.g., between ECS at the LaRC DAAC and ECS at the GSFC DAAC).

Simulators are used for verifying external interfaces except in those cases where the system on the other side of the interface is mature and available to support the acceptance test when needed.

Data content flowing across Release A interfaces include: AM-1 Level-0 data, and real time and routine TRMM data from SDPF and EDOS; ancillary data from NOAA; schedule data to/from NCC, SDPF, and EDOS; and selected Level-0 through Level-3 to the SCFs. Figure 7-1 is a graphical representation of the interfaces between ECS sites associated with the LaRC DAAC. A summary of the content and carriers associated with the data flowing across LaRC ECS interfaces is shown in Table 7-1.

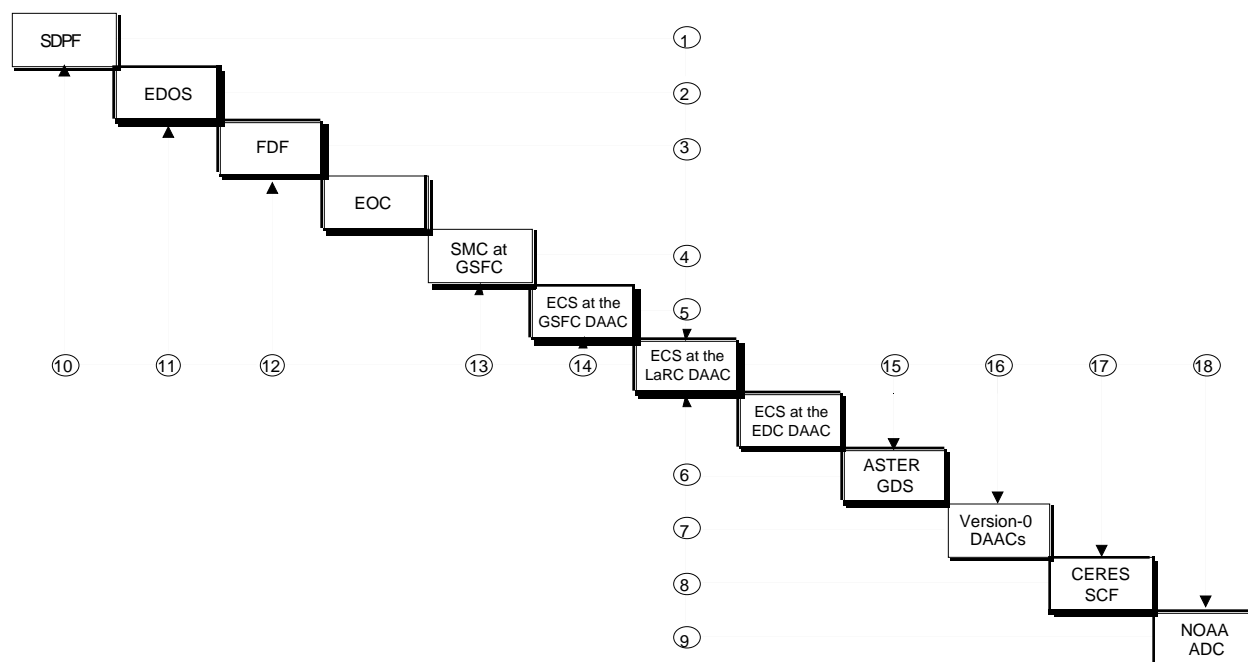


Figure 7-1. LaRC Interface Nodes

Table 7-1. LaRC ECS Release A Data Flow Interfaces (1 of 2)

Node	Mission	Source	Destination	Carrier/Media	Data Content
1	TRMM	SDPF	ECS at the LaRC DAAC	EBnet	Quicklook Data Product; Level-0 Data Products; Ephemeris Data File.
2	AM-1	EDOS	ECS at the LaRC DAAC	EBnet	Service Request Disposition; PDSs (Level-0 data); PDS Delivery Record; Undetected Fault Isolation.
3	AM-1	FDF	ECS at the LaRC DAAC	NOLAN	Refined Orbit/Attitude data.
4	TRMM AM-1	SMC at GSFC	ECS at the LaRC DAAC	Ebnet	Policies; Conflict Resolution; Procedures; Directives.
5	TRMM	ECS at the GSFC DAAC	ECS at the LaRC DAAC	Ebnet	Ebnet, TOMS, TMI & NMC Data.

Table 7-1. LaRC ECS Release A Data Flow Interfaces (2 of 2)

Node	Mission	Source	Destination	Carrier/Media	Data Content
6	AM-1	ASTER GDS	ECS at the LaRC DAAC	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.
7	All Missions	Version-0 DAACs	ECS at the LaRC DAAC	EBnet	Directory Search Results; Inventory Search Results; ftp and Integrated Browse Results; Product Results; Quit; Pong.
8	AM-1	CERES SCF	ECS at the LaRC DAAC	NSI	Algorithms; Remote Access Session Dialog; Request for Operational Data Production Software Package; Request for Test Products after Software Integration and Test; Test Product Reviews; QA Notification Specification; QA Metadata Updates; Request for Processing Status; Request for Resource Usage; Reprocessing Requests.
9	AM-1	NOAA ADC	ECS at the LaRC DAAC	NSI	Advertising Information; Dependent Validates Update; Inventory Search Result; Integrated Browse Result; FTP Browse Result; Product Result Message; Guide Result.
10	TRMM	ECS at the LaRC DAAC	SDPF	EBnet	Data Requests & Data Transmission Confirmation.
11	AM-1	ECS at the LaRC DAAC	EDOS	Ebnet	Fault report; Fault Isolation Request; Level-0 data.
12	AM-1	ECS at the LaRC DAAC	FDF	NOLAN	Data Requests & Data Transmission Confirmation
13	All Missions	ECS at the LaRC DAAC	SMC at GSFC	EBnet	Conflict Resolution Request; Status, Performance
14	TRMM	ECS at the LaRC DAAC	ECS at the GSFC DAAC	Ebnet	VIRS, TOMS, TMI & NMC Data.
15	AM-1	ECS at the LaRC DAAC	ASTER GDS	NSI	Algorithms, Source Code, Documentation, SCF Interaction; Level 1 Data Products; Product Requests; Data Products; Status; System and Network Management; User Authentication, User Data Search & Request, User Product Requests, Status.
16	All Missions	ECS at the LaRC DAAC	Version-0 DAACs	EBnet	Directory Search Requests; Inventory Search Requests; Acknowledgments; Browse Request; Product Request; Statistics; Quit; Pong.
17	AM-1	ECS at the LaRC DAAC	CERES SCFs	NSI	ECS Software Package; I & T Requirements; Science Software Integration Test Status; Data Availability notices; Operational Science Data Production Software Package; Test Product Availability Message during Software I & T; QA Notification Specification Acknowledgement; Data Quality Request Notification; Data Delivered for QA; Processing Status; Resource usage; Reprocessing Request Acknowledgement; Product history.
18	AM-1	ECS at the LaRC DAAC	NOAA ADC	NSI	Inventory Search; Browse Request; Product Request; Guide Search.

7.2.1 LaRC Facility and Test Environment

The Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) EOSDIS Core System (ECS) is located at the NASA/LaRC in Hampton Roads, Virginia. Figure 7-2 shows the LaRC floor plan in the Release A time frame. Included in the diagram is the LaRC DAAC, the location of the computers and the V0 DAAC.

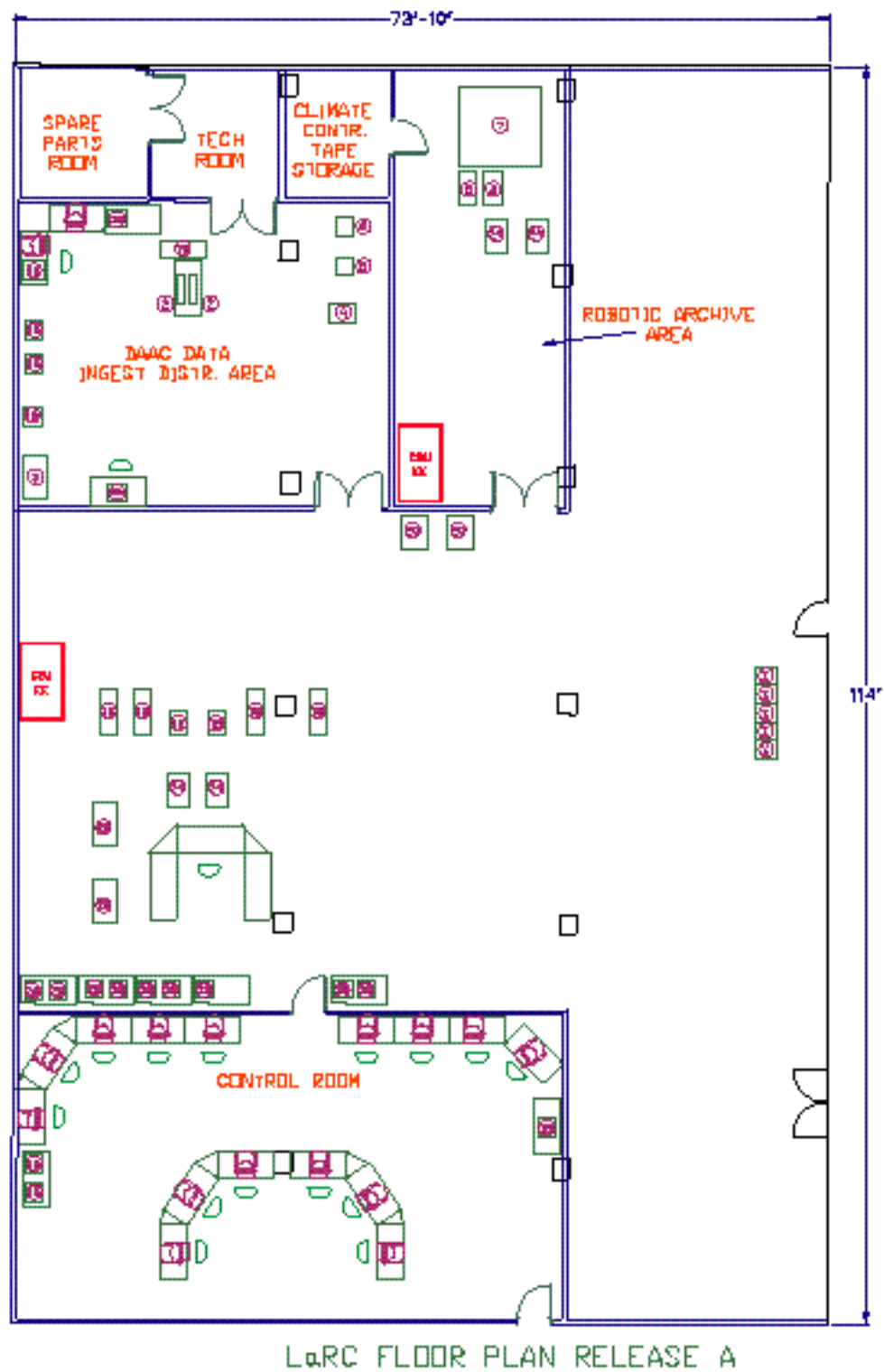


Figure 7-2. Release A LaRC Floor Plan

7.2.2 LaRC Test Environment Safety Considerations

The Hazard Analyses for the ECS Project (DID 513) considered both hardware and software caused hazards for each element and segment of ECS. Hazards to ECS personnel and to ECS equipment, and potential hazards external to ECS were considered. This analysis concluded that the effect of ongoing and future planning and implementation processes to purchase, verify, integrate and test, install, operate and maintain COTS hardware minimizes the potential for a ground system hazardous condition to personnel or equipment. These various processes and the documents that describe them are:

- Procurement of COTS hardware to commercial practice UL performance and safety standards. Other commercial standards such as ANSI, BICSI, CCITT, EIA, IEEE, ISO, and NEC may also be applicable. The COTS hardware installed in the user environment has been engineered for the user desktop operating environment with enclosed components and no exposure to moving parts or electrical discharge. The COTS hardware installed in the data center environment is accessible only to authorized, trained and certified operators and maintainers.
- Installation and Facility Planning to provide the DAACs with site specific Installation Plans and the ECS Facilities Plan (DID 302) to provide the planning necessary to assure that each ECS component meets all requirements for interfacing with the facilities in which they are located. The Facilities Plan contains physical layout, electrical power requirements, air conditioning requirements, antenna foundation, final equipment layout, mechanical/electrical loads, and functional arrangements.
- Environmental Control Planning to identify, in the Environmental Control Plan (DID 532), suitable environmental and cleanliness controls for all areas used for the operation, storage, maintenance, repair, inspection, or test of system equipment.
- Maintenance Planning, in the COTS Maintenance Plan (DID 613), to describe policies and procedures to be applied to maintenance of all hardware and software under M&O responsibility.
- M&O Procedures and the Operational Readiness Plan (DID 603) to describe the processes to assure all elements are in a state of operational readiness at all times.
- M&O Personnel Certification and Training to define the certification and COTS training required to prepare personnel to operate, maintain, and use the ECS. The COTS Training Plan (DID 622) and the M&O Certification Plan (DID 626) detail the approach and procedures required.
- Security Planning documents the approach to physical, informational and personnel security in the ECS Security Plan (DID 214).
- Disaster Recovery and Emergency Preparedness Planning is contained in the EDF Disaster Recovery Plan which provides for the safety and the protection of HAIS and the safeguarding of NASA computer resources and data assets. The Emergency Preparedness Plan focuses on personnel, visitors, and non-data assets.

During the pre-test meeting with LaRC management, the following safety risks are determined:

- a. Identification of hazardous situations and/or operations
- b. Precautions and safety instructions to insure the safety of all personnel
- c. Precautions and safety instructions to prevent degradation of test articles and measuring equipment
- d. Environmental and/or other conditions to be maintained within tolerances
- e. Specifications for facility, equipment maintenance, housekeeping, certification, inspection, safety and handling requirements before, during and after test activities.

The ATO Test Conductor coordinates with LaRC and ECS management and maintenance and operations personnel, and the Quality Office representatives concerning safety issues. If equipment, environmental, or personnel safety concerns arise, the Test Conductor immediately takes steps to ensure the safety of the personnel and equipment, notifies LaRC management, and coordinates corrective actions.

7.3 TRMM Operations Activities Mapped to Test Sequences

Figure 7-3 shows a context diagram of the functions related to the support of the TRMM mission at the LaRC DAAC. The diagram shows the TRMM input data or stimuli, the resultant outputs, and the test sequences that are used to verify functional and performance requirements at the LaRC DAAC. Other Release A related functions depicted, which the LaRC DAAC is expected to support, are Level-0 Data Migration and Interoperability, and TOMS Ozone Data Ingest and Archive.

7.3.1 AM-1 Interface Testing

In addition to the tests exercised as part of the TRMM related test activities, several sequences are devoted to the early testing of the LaRC DAAC interfaces with other sites. These sequences include:

<u>Number</u>	<u>Sequence Title</u>
9.1.3	Early AM-1 Interface Test Support
12.1.1	Inter-Site Message Sequence
12.1.2	Multi-Site System Management Sequence
12.5.1	Data Ingest, Data Server and Data Distribution Performance Sequence
12.5.4	ECS Testability and Overall Capabilities Sequence

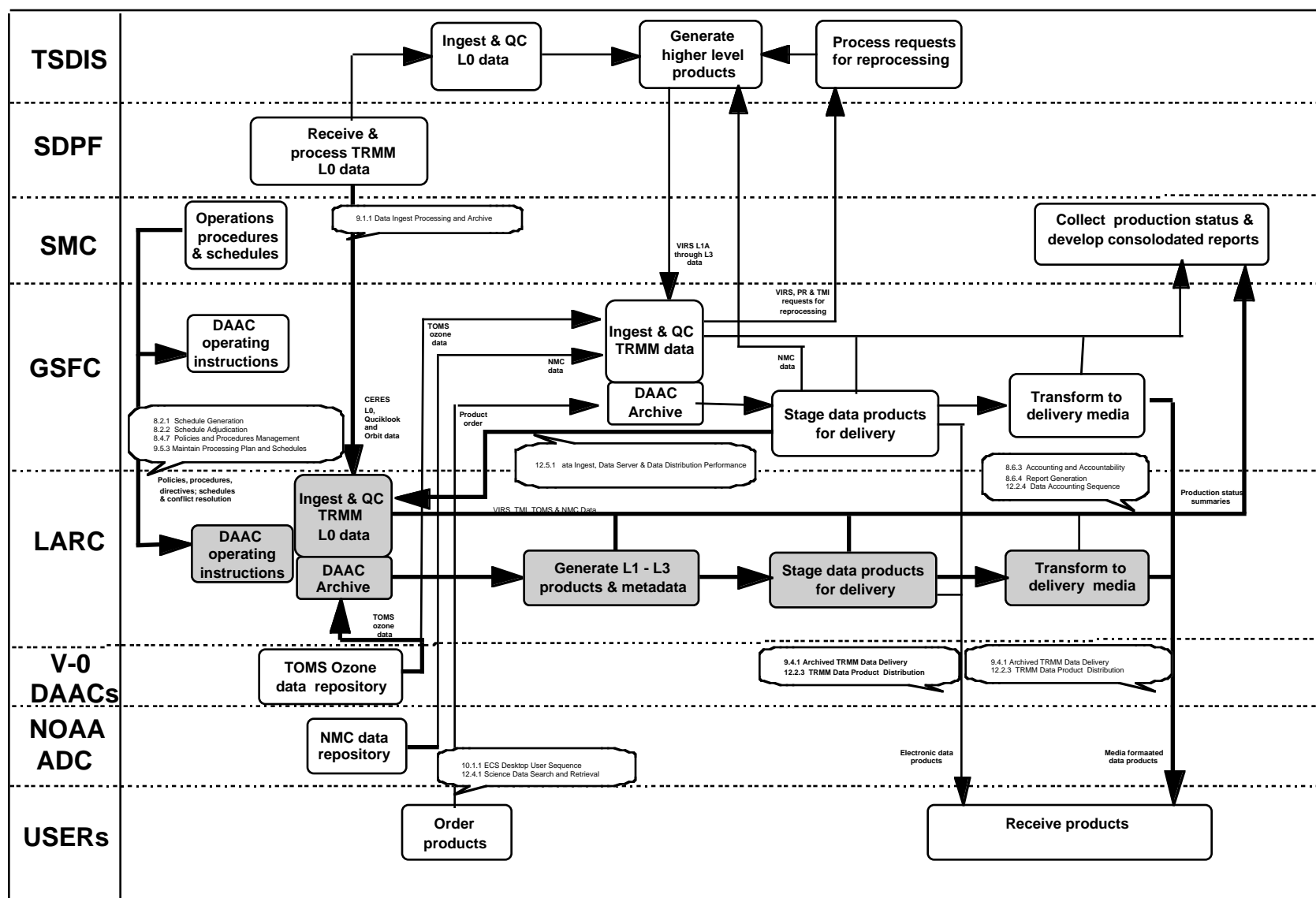


Figure 7-3. LaRC DAAC TRMM Operations Test Sequences

7.3.2 AM-1 Science Software Integration & Test

Acceptance test activities do not include the verification of science software. Instead, tests include demonstrations of ECS's infrastructure to support the installation and operation of science applications on the Release A ECS system. This is accomplished at the LaRC DAAC by exercising the following sequences:

Number	Sequence Title
10.2.2	LaRC SCF/ECS Sequence
12.1.2	Multi-Site System Management Sequence

7.4 LaRC Configuration

Following a successful CSR, Release A is formally installed at the LaRC DAAC. The formal installation of Release A includes custom code and commercial-off-the-shelf (COTS) software and, as applicable, executables, load modules, test data sets, test tools, and documentation. The formal installation at the operational sites is performed by the I&T organization, supported by the CMO and the M&O organization. The system configuration needed to perform the acceptance test sequences is described in Table 7-2.

Table 7-2. LaRC ECS DAAC Release A System Configuration (1 of 5)

Subsystem	HWCI/CSCI	Platform	Custom Executables	COTS
Ingest	ICLHW	ICLHW-LaRC-1.1.2 (Ingest server)	peer agent	Irix Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, net.h++, tools.h++, dbtools.h++, sybase server, Remedy*, Tivoli client, wabi/office, netscape browser, essm, sqr wkbch, Npassword, TCPWrappers, Tripwire, Crack
Ingest	ICLHW	ICLHW-LaRC-4,5 (LaRC-5 will be used for EDOS early interface testing)	IngestServer, IngestSession, CSS SDPF gateway, CSS TSDIS Gateway, PollingIngest, Staging disk class libraries, RequestManager, peer agent, preprocessing executables, Ingest user and operator guis, advertising clients, sdsrv wrapper	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, net.h++, tools.h++, dbtools.h++, sybase server, essm, Remedy*, Tivoli client, wabi/office, netscape browser, Npassword, TCPWrappers, Tripwire, Crack, kftp, ftp,kerberos
			subscription engine, peer agent	sqr wkbch
CSS	DCHCI	CSS-LaRC-1 (CSS server) and MSS-LaRC-4 (MSS server)	DCE Directory, Security and Time servers, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, net.h++, tools.h++, dbtools.h++, Remedy*, Tivoli, wabi/office, netscape browser, mail server, Npassword, TCPWrappers, Tripwire, Crack
MSS	MSSHCI	MSS-LaRC-4 (MSS server) and CSS-LaRC-1 (CSS server)	MsAgDpty, peer agent	Op sys,snmp agent, dce, oodce, motif, x11r5, ClearCase client, C, C++, Softbench, bx, graphpak, epak, net.h++, tools.h++, dbtools.h++, Remedy TT, Tivoli server, wabi/office, Sybase server, essm, sqr wkbch, PNM, HPOV, dce dev tlkt

Table 7-2. LaRC ECS DAAC Release A System Configuration (2 of 5)

Subsystem	HWCI/CSCI	Platform	Custom Executables	COTS
				Npassword, TCPWrappers, Tripwire, Crack, Satan, netscape browser
				HAL DCE cell manager
MSS	MSSHCI	MSS LaRC-1.1	ClearCase, peer agent, Software change manager (DDTS), Inventory change manager (SoftPC/MS Office), XRP II Baseline Manager,	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase server and client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, sybase client, sqr wkbch
				Npassword, TCPWrappers, Tripwire, Crack, Satan
MSS	MSSHCI	MSS-LaRC-3 (MSS WS)	GUI executables, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, Npassword, TCPWrappers, Tripwire, Crack
Data Server	ACMHW	ACMHW-LaRC-1,2 (Ops WS)	Ingest operator GUI, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, Npassword, TCPWrappers, Tripwire, Crack
Data server	ACMHW	ACMHW-LaRC-3 and 4 (APC sybase server)	peer agent, STMGT Network resource manager	Irix Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, net.h++, tools.h++, dbtools.h++, sybase server, Remedy*, Tivoli client, wabi/office, netscape browser, essm, sqr wkbch, Npassword, TCPWrappers, Tripwire, Crack
Data Server	ACMHW	MSS-MSFC-1 (becomes ACMHW-LaRC-5) front-end to APC server	Science Data Server Process, peer agent, SDSRV admin process, STMGT network resource manager, STMGT pull monitor process, ingest server, ingest session, polling ingest, ingest request manager, advertising clients	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, sybase client, Npassword, TCPWrappers, Tripwire, Crack, kftp, kerberos, sqr wkbch
			CSS SDPF gateway, CSS TSDIS gateway, SDSRV wrapper, subscription engine, staging disk class libraries, cgi scripts	
Data Server	DIPHW	DIPHW-LaRC-1 and 2 (distribution server)	DDIST Distribution server process, peer agent, STMGT CDROM Resource management process, STMGT tape resource manager, STMGT printer resource manager	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, Npassword, TCPWrappers, Tripwire, Crack, ftp
Data Server	DRPHW	DRPHW-LaRC-1 and 2 (FSMS server)	peer agent, STMGT Staging Resource Manager Process, STMGT archive manager	Irix Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, C, C++, F77, CaseVision, bx, graphpak, epak, net.h++, tools.h++, dbtools.h++, amass, Remedy*, Tivoli client, wabi/office, netscape browser, dce dev tlkt, nfs
				Npassword, TCPWrappers, Tripwire, Crack

Table 7-2. LaRC ECS DAAC Release A System Configuration (3 of 5)

Subsystem	HWCI/CSCI	Platform	Custom Executables	COTS
Data Server	DRPHW	DDSHW-MSFC-2 (becomes DRPHW-LaRC-6) front-end sun	peer agent, STMGST Staging Resource Manager Process, STMGST Staging Disk Monitor Process, advertising server, ingest request manager	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, Remedy*, Tivoli client, wabi/office, netscape browser, sybase client, dbtools.h++, Npassword, TCPWrappers, Tripwire, Crack, sqr wkbch
Data Server	DRPHW	DRPHW-LaRC-3 and 4 (DBMS server)	peer agent	Irix Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, sybase server, Remedy*, Tivoli client, wabi/office, netscape browser, essm, sqr wkbch, Npassword, TCPWrappers, Tripwire, Crack
Data server	DDSHW	DDSHW-LaRC-1 and 2	Document Data server process, peer agent, document repository process, www server process (secured, and unsecured), Advertising Custom CGI Bin Programs, advertising clients	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, Remedy*, Tivoli client, wabi/office, netscape commerce server, TOPIC server, illustra, sqr wkbch, dbtools.h++, Npassword, TCPWrappers, Tripwire, Crack
				Npassword, TCPWrappers, Tripwire, Crack, Netscape server (secured and unsecured; must be configured for DNS lookup)
Planning	PLNHW	PLNHW-LaRC-2 (Planning and queuing server)	peer agent, Resource planning application, Production planning application, subscription manager, advertising clients, delphi hcl,	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, C, C++, Sparcworks, bx, graphpak, epak, tools.h++, dbtools.h++, sybase server, essm, net.h++, Remedy*, Tivoli client, dce dev tlkt, wabi/office, sqr wkbch
			Autosys DB server (shadow), Autosys event processor (backup), execution manager, data manager, Resource manager, Autosys operators console, AutoXpert (including jobscape, timescape, hostscape)	Npassword, TCPWrappers, Tripwire, Crack, netscape browser, Autosys, AutoXpert, multithreaded debugger
			PDPS Database server	
Planning		PLNHW-LaRC-1 Planning Workstation	peer agent, Production planning application, Resource Planning application, Autosys Operators console, AutoXpert (including Jobscape, TimeScape and Hostscape), ECS Desktop	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, sybase client, Remedy*, Tivoli client, d wabi/office, netscape browser, Npassword, TCPWrappers, Tripwire, Crack, sqr wkbch
Processing	SPRHW	SPRHW-LaRC-5,6 (Science Processor)	Autosys remote agent, peer agent (currently does not run), HDF-EOS, SDP Toolkit, Data Preprocessing, Science software, Processing support scripts	Irix Op sys, snmp agent, dce, motif, x11r5, ClearCase client, C, C++, F77, Ada, F90, CaseVision, bx, graphpak, epak, tools.h++, dbtools.h++, sybase client, Remedy*, wabi/office, netscape browser, IDL, IMSL Autosys, autoxpert, autosys remote agent
				Npassword, TCPWrappers, Tripwire, Crack, kftp, kerberos, sqr wkbch, Tivoli client

Table 7-2. LaRC ECS DAAC Release A System Configuration (4 of 5)

Subsystem	HWCI/CSCI	Platform	Custom Executables	COTS
Processing	AQAHW	PLNHW-LaRC-2 (no dedicated hw at LaRC for qa)	Ops QA monitor, ECS DSKTP, peer agent, EOSView, HDF-EOS	
Processing	AITHW	AITHW-LaRC- 1,2,3	Production planning application, Resource Planning application, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, C, C++, Sparcworks, bx, graphpak, epak, tools.h++, dbtools.h++, Remedy*, Tivoli client, dce dev tlkt, wabi/office, netscape browser, f77, f90, ada, idl, imsl
			Document viewing, AIT Manager GUI, AI&T Tools, PGE Processing GUI, PGE Registration GUI, AutoSys Operators Console	Sybase Client, FORCHECK, Ghostview, emacs, Adobe acrobat, WABI, XEDIT, autosys remote agent, Npassword, TCPWrappers, Tripwire, Crack, kftp, sqr wkbch
			Autosys Xpert GUIs (TimeScape, JobScape, HostScape), ECS DSKTP, EOSView, HDF-EOS,	Npassword, TCPWrappers, Tripwire, Crack, kerberos
Processing	AITHW	AIT Workstation/ DBMS Server	Subscription manager, PDPS DB server. Autosys DB server, AutoSys Event Processor, Autosys Agent, Data Manager, Execution Manager, Resource Manager, peer agent, ECS Desktop, advertising clients	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, C, C++, Sparcworks, bx, graphpak, epak, tools.h++, dbtools.h++, Remedy*, Tivoli client, dce dev tlkt, wabi/office, netscape browser, f77, f90, ada, idl, ims,
			SDP Toolkit, HDF-EOS	Sybase server, FORCHECK, Ghostview, emacs, Adobe acrobat, Netscape browser, WABI, XEDIT, autosys remote agent, essm, sqr wkbch
				FORCHECK, Ghostview, emacs, Adobe acrobat, WABI, XEDIT, Npassword, TCPWrappers, Tripwire, Crack, NCSA mosaic
Data Management	DMGHW	DMGHW-LaRC-1, 2, 3 (Data Specialist Workstation)	Specialist GUIs, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, Sybase client, netscape browser, Npassword, TCPWrappers, Tripwire, Crack, sqr wkbch
Data Management	DMGHW	DMGHW-LaRC-6 (DBA Ops Workstation)	Specialist GUIs, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, Sybase client, netscape browser, Npassword, TCPWrappers, Tripwire, Crack
Data Management	DMGHW	DMGHW-LaRC- 4,5 (DMG Server)	DMG Gateway, CSS Gateway executables - 2 processes per connection, peer agent	Op sys, snmp agent, dce, oodce, motif, x11r5, ClearCase client, tools.h++, dbtools.h++, Remedy*, Tivoli client, wabi/office, Sybase server & client, netscape browser, kerberos, Npassword, TCPWrappers, Tripwire, Crack

Table 7-2. LaRC ECS DAAC Release A System Configuration (5 of 5)

Subsystem	HWCI/CSCI	Platform	Custom Executables	COTS
			CSS Gateway executables - 2 processes per connection	net.h++, essm, sqr wkbch, kftp
Interoperability	ADSHWCI co-located with DMGHWCI	DMGHW-LaRC-4, 5 (DMG Server)	COTS Sybase Replication server, COTS Sybase SQL Server, Custom Advertising Server, Custom Library for Advertising Clients, COTS Sybase Admin Tools (essm)	Npassword, TCPWrappers, Tripwire, Crack
	Users and Operators Workstation		Custom Installer Program	C++, Motif, Tools.h++, Miller C++ Libraries (Public Domain)
Client	DESKT	All operator workstations and servers (if xterms access servers)	EcsDesktop	ROGUEWAVE tools.h++ OODCE DCE C/C++ Doug Young's Library for Motif/C++ 1992 EPak Widgets
				Motif Window Manager, mwm (Solaris or SunOS) or platform-dependent alternative: Vewwm (HP), 4Dwm (SGI), NCDs (NCDwm), etc.
				Web browser: Netscape
				DCE OODCE Motif or CDE with equivalent Motif version ICS Builder Xcessory ICS EPak widgets RogueWave tools.h++ C/C++ compilers and debuggers
				Doug Youngs's C++ library for Motif 1992 version ECS C++ widget wrapper library (TBD)
Client	WKBCH		User Registration Tool User Profile Tool	Same as Client

Notes: (1) The development environment is provided only on selected platforms; (2) Remedy Trouble ticketing is installed only on the MSS server; (3) All platforms that have Remedy indicated will have access via Netscape browser.

7.4.1 LaRC Hardware Configuration

The LaRC hardware configuration builds on the Ir1 supplied capacity and is designed primarily to support CERES product archival, early AI&T for MODIS and various forms of interface testing. Given these requirements, a significant subset of the subsystems have supplied components at the site: Data Server (for CERES data archival, and document services), Data Management (for V0 Gateway and Advertising Support), Data Processing (for AI&T science processing capacity), Planning (for early interface testing and demonstration, not operations), Ingest (for interface testing), Management (MSS, for local site management), Communications (CSS) and communications infrastructure support (ISS). Figure 7-4 provides an overview of the entire configuration and includes the core Ir1 configuration built upon by the Release-A required units (shaded components are added at Release A).

7.4.2 LaRC Software Configuration

Below is a brief overview of the ECS software subsystems. A more comprehensive description can be found in the Release A LaRC DAAC Design Specification for the ECS Project (DID 305).

- **Client Subsystem (CLS):** This software consists of graphic user interface (GUI) programs, tools for viewing and/or manipulating the various kinds of ECS data (e.g., images, documents, tables) and libraries representing the client application program interface (API) of ECS services. For Release A, the client subsystem consists of the desktop, an advertising user interface, and a data visualization tool (EOSView). The remainder of the Release A user interface is provided by an enhanced version of the V0 System Client. The client subsystem component is available to users for installation on their workstations and also is deployed on workstations within the DAAC in support of normal operations, including User Services support.
- **Interoperability Subsystem (IOS):** This subsystem maintains a database of information about the services and data offered by ECS, and allows users to search through this database to locate services and data that may be of interest to them. It provides an advertising service implemented as an SDPS developed distributed database application on top of a commercial off-the-shelf Data Base Management System (DBMS). The user interface to this subsystem is the Client subsystem.
- **Data Management Subsystem (DMS):** This subsystem includes functions which provide uniform access to descriptions of the data and the data elements offered by the EOSDIS repositories and provide a bi-directional gateway between ECS and Version 0. This subsystem also includes distributed search and retrieval functions and corresponding site interfaces; however, they are not part of the Release A design.
- **Data Server Subsystem (DSS):** The subsystem provides the physical storage access and management functions for the ECS earth science data repositories. Other subsystems can access it directly or via the data management subsystem (if they need assistance with searches across several of these repositories). The subsystem also includes the capabilities needed to distribute bulk data via electronic file transfer or physical media. Other components include, for example, administrative software to manage the subsystem resources and perform data administration functions (e.g., to maintain the database schema); and data distribution software, e.g., for media handling and format conversions. The main components of the subsystem are the following:
 - database management system - SDPS uses an off-the-shelf DBMS (SYBASE) to manage its earth science data and implement spatial searching, as well as for the more traditional types of data (e.g., system administrative and operational data). It uses a document management system to provide storage and information retrieval for guide documents, scientific articles, and other types of document data.
 - file storage management systems - they are used to provide archival and staging storage for large volumes of data. SDPS is considering the use of several hardware/software configurations which are either off-the-shelf or a mixture of off-the-shelf and developed software.

- data type libraries - the libraries implement functionality of earth science and related data that is unique and not available off the shelf (e.g., spatial search algorithms and translations among coordinate systems). The libraries interface with the data storage facilities, i.e., the database and file storage management systems.
- **Ingest Subsystem (INS):** The subsystem deals with the initial reception of all data received at an EOSDIS facility and triggers subsequent archiving and processing of the data. Given the variety of possible data formats and structures, each external interface, and each ad-hoc ingest task may have unique aspects. Therefore, the ingest subsystem is organized into a collection of software components (e.g., ingest management software, translation tools, media handling software) from which those required in a specific situation can be readily configured. The resultant configuration is called an ingest client. Ingest clients can operate on a continuous basis to serve as a routine external interface; or they may exist only for the duration of a specific ad-hoc ingest task.
- **Data Processing Subsystem (DPS):** The main components of the data processing subsystem - the science algorithms - are provided by the science teams. The data processing subsystem provides the necessary hardware resources, as well as software for queuing, dispatching and managing the execution of these algorithms in an environment which eventually will be highly distributed and consist of heterogeneous computing platforms. The DPS also interacts with the DSS to cause the staging and de-staging of data resources in synchronization with processing requirements.
- **Planning Subsystem (PLS):** This subsystem provides the functions needed to pre-plan routine data processing, schedule ad-hoc processing, and dispatch and manage processing requests. The subsystem provides access to the data production schedules at each site, and provides management functions for handling deviations from the schedule to operations and science users.
- **Management Subsystem (MSS):** The Management Subsystem (MSS) provides enterprise management (network and system management) for all ECS resources including: commercial hardware (including computers, peripherals, and network routing devices), commercial software, and custom applications. Enterprise management reduces overall development and equipment costs, improves operational robustness, and promotes compatibility with evolving industry and government standards. Consistent with current industry trends, the MSS thus manages both ECS's network resources per EBnet requirements and ECS's host/application resources per SMC requirements. Additionally MSS also supports many requirements allocated to SDPS and FOS for management data collection and analysis/distribution.

The MSS allocates services to both the system-wide and local levels. With few exceptions, the management services is fully decentralized, no single point of failure exists which would preclude user access. In principle every service is distributed unless there is an overriding reason for it to be centralized. MSS has two primary key specialization's: Enterprise Monitor and Coordination Services and Local System Management Services.

For IR-1 and Release A not all of the MSS services are fully implemented, some are provided through COTS and COTS customization, while others are provided through the use of Office Automation (OA) tools.

- **Communications Subsystem (CSS):** The CSS services include Object Services, Distributed Object Framework (DOF) and Common Facility Services. Support in this subsystem area is provided for peer-to-peer, advanced distributed, messaging, management, and event-handling communications facilities. These services typically appear on communicating end-systems across an internetwork and are not layered, but hierarchical in nature. Additionally, services to support communicating entities are provided, included directory, security, time, and other ancillary services. The services of the Communications Subsystem are functionally dependent on the services of the Internetworking Subsystem. The services of the common facility, object and DOF are the fundamental set of interfaces for all CSMS management and FOS and SDPS user access (i.e., pull) domain services. The DOF services are the fundamental set of dependencies of the common facility and object services.
- **Internetworking Subsystem (ISS):** The Internetworking Subsystem provides for the transparent transfer of data between end systems within local and wide area networks. The ESN LANs are responsible for transfer of data within the DAACs, SMC and EOC. ECS interfaces with external systems and DAAC to DAAC communications are provided by the EOSDIS Backbone Network (EBnet). EBnet's primary function is to transfer data between DAACs, including both product data and inter-DAAC queries and metadata responses. Other networks, such as NSI, provide wide-area services to ECS. In addition, "Campus" networks, which form the existing networking infrastructure at the ECS locations, provides connectivity to EOSDIS components such as SCFs and ISTs.

Document number: 420-TD-003-001 (6/26/96)

Rel A: Final Buy
To be Proc

Rel A: Initial Buy

Existing Program Equip



7.5 Acceptance Test Preparation

ATO holds an Acceptance Test kick-off briefing with LaRC management personnel. The kick off meeting discusses the following:

- LaRC's readiness to conduct Acceptance Test
 - Results of hardware and software installation
 - External interface availability
- Required personnel
- Daily test execution schedules

7.5.1 LaRC's Site Readiness to Conduct Acceptance Test

The results of the hardware and software installation, and any associated problems, are analyzed by LaRC management and ATO during the kick-off meeting. In addition, LaRC management verifies the status of the necessary external interfaces and the expected site layout. The external interfaces needed for LaRC Acceptance Tests are depicted in Figure 7.1. Figure 7-2 depicts the expected LaRC site layout.

7.5.2 Required Personnel

During the kick-off meeting, LaRC management personnel have an opportunity to review and verify that the needed LaRC personnel are available to conduct the planned test events. Sections 8-12 lists the necessary LaRC personnel needed for each test sequence. Acceptance testing is a formal process that requires the coordination of different organizations. Each organization has well-defined roles and responsibilities for the acceptance testing process. Below is a summary of these organizations and personnel.

Acceptance Test Organization (ATO): The ATO assigns a test manager to coordinate and run acceptance testing. The ATO also provides test conductors to execute the step by-step procedures that are defined in the ATPr. Test conductors also write, collect, and track nonconformance reports and determine the impact of these reports on test plans, scenarios, test cases, and procedures.

Quality Office (QO): The QO provides a representative to witness the execution of acceptance testing. The QO also tracks the status of nonconformance reports and reviews them prior to closure to ensure that the required actions have been completed.

Configuration and Data Management Organization: The Configuration Management Office (CMO) coordinates with the ATO to capture the test configuration of software, hardware, test data, test tools, and documentation prior to test execution to ensure repeatability. They also capture and retain test outputs (e.g., test logs, data, and modified procedures) and distribute copies for test analysis. The product baseline, which is established prior to the RRR and includes test reports, is maintained by the CMO.

ECS Maintenance & Operations (M&O) Organization: As part of acceptance testing at the test site, the government site manager assigns M&O personnel who are integrated into the test team to help execute acceptance tests. The early first-hand involvement of the site manager and his operations personnel in site acceptance testing provides the M&O Team with early visibility into each new release and hastens a smooth transition. This involvement and familiarity with ECS software in the stages before release to the user base greatly enhance the effectiveness and productivity of the M&O staff and positions a highly competent and responsive user support staff on-site at the DAACs. In addition, during the M&O phase, the ATO assists by providing benchmark tests to verify operational performance of the ECS system. The ATO provides guidance in acceptance testing during the verification of approved changes and enhancements.

ESDIS SI&T Contractor: The ESDIS Integration Contractor and the Independent Verification and Validation (IV&V) Contractor witness and monitors acceptance testing, as directed by the ESDIS SI&T, and the IV&V Contractor.

The Acceptance Test Team (ATT) consists of various personnel who assist the ATO Test Conductor during the acceptance testing phases. Listed below are the DAAC role players and a brief description of their responsibilities.

DAAC Computer Operator: Operate DAAC host processors, supporting restarts, reboots and shutdowns. Monitor system status and respond to console messages, documenting all operations problems and actions.

DAAC Ingest/Distribution Technician: Receives, logs and marks all non-electronic media for processing and storage in the ECS system.

DAAC Operations Readiness and Performance Assurance Analyst: Responsible for ensuring DAAC staff, hardware, software, documents and databases are in a state of operational readiness at all times including requisite DAAC system changes and launch preparations.

DAAC Operations Supervisor: Ensure all operations staff adhere to established policies, procedures and schedules. Provide direction and assistance to "on-line" operations staff as needed.

DAAC Production Monitor: Monitor science software execution via automated tools. Manage On-Demand and planned processing schedules and requests, document and support problem resolution and report performance status.

DAAC Production Planner: Develop daily, weekly and monthly DAAC science production schedules. Populate and maintain production database with science software characteristics, production rules and priorities. Develop and maintain ancillary/input data schedules.

DAAC Resource Manager: Coordinate with SMC for network problems and DAAC reconfigurations in response to ECS system anomalies. Responsible for site hardware, software, LAN and local DCE cell configuration, allocation and utilization performance.

DAAC Resource Planner: Responsible for reviewing and integrating all resource requests for DAAC system resources into daily, weekly and monthly DAAC resource schedules.

In addition to the operations staff, AT may draw upon available mission operations expertise from the following:

- DAAC Administrative Assistant
- DAAC Archive Manager
- DAAC System Administrator
- DAAC Configuration Management (CM) Administrator
- DAAC Database Administrator
- DAAC ECS Contractor Manager
- DAAC Maintenance Coordinator
- DAAC Integrated Logistics Support (ILS) Administrator
- DAAC Science Coordinator
- DAAC Science Software I&T Support Engineer
- DAAC Software (S/W) Maintenance Engineer
- DAAC System Engineer
- DAAC System Test Engineer
- DAAC User Services Representative
- DAAC Science Data Specialist

7.6 Acceptance Test Sequences

The acceptance testing of Release A capabilities is divided into five major scenario groups: System Management, Push, Pull, flight operations, and End-to-End. These scenario groups identify hi-level ECS functionality from a user and operations viewpoint. Each group is further sub-divided into scenarios that emulate the operations and user environment. Scenarios are further broken down into more manageable test sequences in which test cases that trace to Level 3 requirements are executed. Sections 8 through 12 describe the nature of each scenario, the test sequences within them, and their individual test cases. Table 7-3 depicts the planned test sequences at all sites, including LaRC.

Table 7-3. Planned Sequence of Test Activities (1 of 5)

Sequence	Test Case	G S F C	L a R C	E D C	S M C	E O C
8.1.1 M&O Procedures Review and Confidence	8.1.1.1 ECS Sites Nominal Operations Policy and Procedures Review	X	X	X	X	X
	8.1.1.2 ECS Hardware and Software Configuration Items Review	X	X	X	X	X
8.1.2 Start-up	8.1.2.1 Site Startup Confidence Test	X	X	X	X	X
	8.1.2.2 Site Restart Including Introduction of Previous Results	X	X	X	X	X
8.1.3 Site Operations	8.1.3.1 SMC Monitoring and Control of Managed Resources				X	
8.1.4 Site Shutdown/Recovery	8.1.4.1 Emergency and Other Abnormal Shutdown	X	X	X	X	X
	8.1.4.2 Recovery from Catastrophic Emergency Shutdown	X	X	X	X	X
	8.1.4.3 Recovery from Abnormal Non-Catastrophic Shutdown	X	X	X	X	X
8.1.5 Site Maintenance	8.1.5.1 DAAC M&O Interfaces	X	X	X		
	8.1.5.2 Maintenance of ECS Databases	X	X	X		
8.1.6 Site Data/Metadata/ Information Management	8.1.6.1 File Management	X	X	X		
	8.1.6.2 ECS Storage/Archive/Backup Capability	X	X	X	X	
8.1.7 Facilities Interface	8.1.7.1 SMC External Interfaces				X	
	8.1.7.2 EOC External Interfaces					X
	8.1.7.3 GSFC DAAC External Interfaces	X				
	8.1.7.4 LaRC DAAC External Interfaces		X			
	8.1.7.5 EDC DAAC External Interfaces			X		
	8.1.7.6 ECS Internal Interfaces	X	X	X	X	X
8.2.1 Schedule Generation	8.2.1.1 DAAC Schedule Generation	X	X			
	8.2.1.2 SMC Schedule Generation				X	
8.2.2 Schedule Adjudication	8.2.2.1 Adjudication of ECS Site Conflicts	X	X			
	8.2.2.2 Adjudicate Contention for Resources Between ECS Sites				X	
8.3.1 Enhancements	8.3.1.1 ECS Enhancements	X	X	X	X	X
8.4.1 Resource Management	8.4.1.1 Resource Management Directive	X	X	X	X	X
	8.4.1.2 Sufficient Storage	X	X			
8.4.2 Maintenance Management	8.4.2.1 On-site Preventive Maintenance				X	
	8.4.2.2 On-site Corrective Maintenance				X	
8.4.3 Logistics Management	8.4.3.1 Logistics Monitoring	X	X	X	X	X
	8.4.3.2 Logistics Replenishment	X	X	X	X	X
8.4.4 Training Management	8.4.4.1 ECS Training and Certification Program Management	X	X	X	X	
	8.4.4.2 On-the-Job Training				X	
8.4.5 Inventory Management	8.4.5.1 Inventory and Configuration Management	X	X	X	X	
	8.4.5.2 LSM Enhancement Evaluation & Implementation Management				X	
	8.4.5.3 SMC Enhancement Evaluation & Implementation Management				X	
8.4.6 Quality Management	8.4.6.1 SMC Quality Assurance				X	
	8.4.6.2 LSM Quality Assurance	X	X	X		X

Table 7-3. Planned Sequence of Test Activities (2 of 5)

Sequence	Test Case	G S F C	L a R C	E D C	S M C	E O C
8.4.7 Policies and Procedures Management	8.4.7.1 Policies and Procedures Control	X	X	X	X	X
	8.4.7.2 Policies and Procedures Maintenance	X	X	X		X
8.4.8 Network Management	8.4.8.1 Network Configuration and Status	X	X	X		X
	8.4.8.2 Directory Service	X	X	X		X
8.5.1 Metrics	8.5.1.1 Performance Metrics Establishment	X	X	X	X	
	8.5.1.2 Performance Measurement and Degradation Response Capability	X	X	X	X	
	8.5.1.3 RMA Assurance Test and Analysis	X	X	X	X	X
8.5.2 Performance, Monitoring, Analysis, and Testing	8.5.2.1 Performance Testing	X	X	X	X	
	8.5.2.2 Performance Monitoring and Analysis	X	X	X	X	X
8.6.1 Fault Management	8.6.1.1 DADS Fault Analysis and Diagnostic Testing	X	X	X		
	8.6.1.2 Product Generation Fault Analysis and Diagnostic Testing	X				
	8.6.1.3 Communications Fault Analysis and Diagnostics Testing	X	X	X	X	X
	8.6.1.4 Push Error	X				
8.6.2 Security Management	8.6.2.1 SMC Security Functions				X	
	8.6.2.2 LSM Security Functions	X	X	X		X
8.6.3 Accounting and Accountability	8.6.3.1 Accountability: Data Tracking and Audit Trails				X	
	8.6.3.2 Accountability: LSM Data Tracking	X	X	X		X
8.6.4 Report Generation	8.6.4.1 SMC Report Generation				X	
	8.6.4.2 LSM Report Generation	X	X	X		X
9.1.1 Data Ingest, Processing, and Archive at ECS/LaRC from SDPF	9.1.1.1 CERES Data Receipt from SDPF to ECS/LaRC Test Procedure		X			
	9.1.1.2 CERES Data Validation/Formatting at ECS/LaRC Test Procedure		X			
	9.1.1.3 CERES Metadata and Level-1 through 4 Data Processing at ECS/LaRC Test Procedure		X			
	9.1.1.4 Archive CERES Data Products at ECS/LaRC Test Procedure		X			
	9.1.1.5 CERES Data Receipt from SDPF to ECS/LaRC (Fault) Test Procedure		X			
	9.1.1.6 CERES Data Validation/Formatting at ECS/LaRC (Fault) Test Procedure		X			
	9.1.1.7 CERES Metadata and Level-1 through 4 Data Processing at ECS/LaRC (Fault) Test Procedure		X			
	9.1.1.8 Archive CERES Data Products at ECS/LaRC (Fault) Test Procedure		X			
	9.1.1.9 Ingest, Validate, and Archive CERES Documentation from SDPF Test Procedure		X			
9.1.2 Data Ingest, Processing, and Archive at ECS/MSFC from SDPF						
9.1.3 Early AM-1 Interface Test Support	9.1.3.1 AM-1 Data Ingest from EDOS at ECS/LaRC Test Procedure		X			
	9.1.3.2 AM-1 Data Ingest from EDOS at ECS/GSFC Test Procedure	X				
	9.1.3.3 AM-1 Data Ingest from EDOS at EDC Test Procedure			X		

Table 7-3. Planned Sequence of Test Activities (3 of 5)

Sequence	Test Case	G S F C	L a R C	E D C	S M C	E O C
9.1.4 Early FDF and AM-1 Interface Test Support	9.1.4.1 Orbit/Attitude Data Ingest from FDF	X				
9.2.1 Higher Level Processed Data Receipt from the V0 DAAC	9.2.1.1 Ingest, Validate, and Archive Migration Version 0 Data from the V0 DAAC	X	X	X		
	9.2.1.2 Ingest, Validate, and Archive TOMS Ozone Ancillary Data from the V0 DAAC	X				
	9.2.1.3 Ingest, Validate, and Archive Migration Version 0 Documentation from the V0 DAAC	X	X	X		
	9.2.1.4 Ingest, Validate, and Archive SAGE II Ancillary Data from the V0 DAAC		X			
9.2.2 Higher Level Processed Data Receipt from the TSDIS to the MSFC DAAC						
9.2.3 Higher Level Processed Data Receipt from the TSDIS to the GSFC DAAC	9.2.3.1 Ingest, Validate, Process, and Archive VIRS Data from TSDIS	X				
	9.2.3.2 Ingest, Validate, and Archive VIRS, PR, TMI, and GV Documentation from TSDIS	X				
	9.2.3.3 Ingest, Validate, and Archive VIRS, PR, TMI, and GV Data from TSDIS (Fault)	X				
9.2.4 Higher Level Processed Data Receipt from EPDS (Landsat-7)	9.2.4.1 Science Planning Information			X		
	9.2.4.2 Ingest Data/Metadata from Landsat-7			X		
9.2.5 Higher Level Processed Data Receipt from the NOAA ADC to the LaRC DAAC	9.2.5.1 Ingest, Validate, and Archive NOAA ADC Ancillary Data at the LaRC DAAC		X			
9.2.6 Higher Level Processed Data Receipt from the NOAA ADC to the GSFC DAAC	9.2.6.1 Ingest, Validate, and Archive NOAA ADC Ancillary Data	X				
9.3.1 Reprocessing Request Receipt/Processing from the SCF (LaRC)	9.3.1.1 SCF Reprocessing Requests Receipt/Validation at the LaRC DAAC Test Procedure		X			
	9.3.1.2 SCF Reprocessing Plan Generation/Dispatching at the LaRC DAAC Test Procedure		X			
	9.3.1.3 CERES Standard and Browse Data Products Reprocessing at the LaRC DAAC Test Procedure		X			
	9.3.1.4 CERES Standard and Browse Data Products QA Assessment Metadata Receipt/Processing at the LaRC DAAC Test Procedure		X			
	9.3.1.5 Reprocessed CERES Data Directories/Inventories Update and Notification Test Procedure		X			
9.3.2 Reprocessing Request Receipt/Processing from the SCF (MSFC)						
9.4.1 Archived TRMM Data Delivery	9.4.1.1 TSDIS Data Requests Receipt/Validation at the MSFC DAAC					
	9.4.1.2 Deliver Archived TRMM Data to the TSDIS from the MSFC DAAC					
	9.4.1.3 GSFC DAAC Data Requests Receipt, Validation, and Deliver Archived TRMM Data to the TSDIS	X				
	9.4.1.4 Deliver Archived TRMM Data to the TSDIS from the GSFC DAAC	X				
9.4.2 Reprocessed Data Receipt from the TSDIS (MSFC)						

Table 7-3. Planned Sequence of Test Activities (4 of 5)

Sequence	Test Case	G S F C	L a R C	E D C	S M C	E O C
9.4.3 Reprocessed Data Receipt from the TSDIS (GSFC)	9.4.3.1 Reprocessed Data Receipt at the GSFC DAAC from TSDIS	X				
9.5.3 Maintain Processing Plan and Schedules	9.5.3.2 Maintain SMC Processing Plans and Schedules	X	X	X		
10.1.1 ECS Desktop User	10.1.1.1 System Access via Network Link	X	X			
	10.1.1.2 System Access via Direct Connection	X	X			
	10.1.1.3 User Registration	X	X			
	10.1.1.4 User Profile	X	X			
	10.1.1.5 Data Access Privileges (DELETED)	X	X			
	10.1.1.6 Directory Search	X	X			
	10.1.1.7 Guide Search	X	X			
	10.1.1.8 Inventory Search	X	X			
	10.1.1.9 Browse	X	X			
	10.1.1.10 Information Search	X	X			
	10.1.1.11 Product Order	X	X			
	10.1.1.12 Distribution Medium	X	X			
	10.1.1.13 Application Programming Interfaces (MOVED)					
	10.1.1.14 Data Product History (DELETED)					
	10.1.1.15 User Statistics Report Generation	X	X			
10.1.2 ECS/Version 0 (V0) System Interoperability	10.1.2.1 ECS User Access to Version 0	X	X	X		
	10.1.2.2 Search ECS & V0 from the ECS Desktop	X	X			
	10.1.2.3 Version 0 User Access to ECS	X	X			
	10.1.2.4 Search ECS & V0 from the V0 Client	X	X			
10.1.3 EOSDIS Core System (ECS)/Affiliated Data Center (ADC) Interoperability	10.1.3.1 ECS User Access to NOAA ADC	X	X			
	10.1.3.2 ECS User Access Request NOAA ADC Product	X	X			
	10.1.3.3 Product Status Request	X	X			
	10.1.3.4 ECS User Search	X	X			
	10.1.3.5 ECS User Access & Search of MSFC SCF Products	X				
10.2.1 GSFC SCF/ECS	10.2.1.1 Algorithm Integration and Test at the GSFC DAAC	X				
	10.2.1.2 Product QA at the GSFC DAAC	X				
	10.2.1.3 Search, Browse, Request, and Receive Data at the GSFC DAAC	X				
	10.2.1.4 Data Management Services at the GSFC DAAC	X				
	10.2.1.5 Toolkit Testing at the GSFC DAAC	X				
10.2.2 LaRC SCF/ECS	10.2.2.1 Algorithm Integration and Test at the LaRC DAAC		X			
	10.2.2.2 Product QA at the LaRC DAAC		X			
	10.2.2.3 Search, Browse, Request, and Receive Data at the LaRC DAAC		X			
	10.2.2.4 Data Management Services at the LaRC DAAC		X			
	10.2.2.5 Toolkit Testing at the LaRC DAAC		X			

Table 7-3. Planned Sequence of Test Activities (5 of 5)

Sequence	Test Case	G S F C	L a R C	E D C	S M C	E O C
11.1.1 EOC Tests						
12.1.1 Inter-Site Message	12.1.1.1 Inter-DAAC and DAAC-SMC Communications	X	X	X	X	X
12.1.2 Multi-Site System Management	12.1.2.1 Schedule Generation, Coordination and Adjudication Support	X	X		X	
	12.1.2.2 TRMM and AM- 1 Resource Scheduling Support	X	X		X	
	12.1.2.3 SMC Support to Integration Test & Simulation Activities				X	
12.2.1 SDPF Data Handling and Processing	12.2.1.1 Retrieve CERES Data from SDPF, Process and Archive Standard CERES' Products at LaRC DAAC		X			
12.2.2 TSDIS Data Handling	12.2.2.1 VIRS, PR, TMI, and GV Data Ingest and Store	X				
12.2.3 TRMM Data Product Distribution	12.2.3.1 TRMM Data Product Distribution	X	X			
12.2.4 Data Accounting	12.2.4.1 Data Product/Data Receipt Accounting	X	X			
12.4.1 Science Data Search and Retrieval	12.4.1.1 Multi-Site Data Search and Access	X	X			
	12.4.1.2 Data Receipt and Data Storage	X	X			
	12.4.1.3 Science Ancillary Data Access	X	X			
12.4.2 Science Data Product Production	12.4.2.1 Science Algorithm Retrieval and Compatibility	X	X			
12.4.3 Science Metadata Production and Storage	12.4.3.1 Metadata Production and Updating	X	X			
	12.4.3.2 Metadata Storage and Retrieval	X	X			
12.4.4 ECS Data Set Interoperability	12.4.4.1 ECS DAAC and V0 DAAC Interoperability	X	X	X		
	12.4.4.2 NOAA Data Centers/ECS DAAC Interoperability	X	X			
12.5.1 Data Ingest, Data Server and Data Distribution Performance	12.5.1.1 High Data Rate Ingest, Archiving and Retrieval	X	X			
	12.5.1.2 Ingest and Archiving of Triple the Average Data Rates	X	X			
	12.5.1.3 GSFC DAAC Data Reprocessing Support and Archiving	X				
	12.5.1.4 LaRC DAAC Data Reprocessing Support and Archiving		X			
12.5.2 System Response Time Performance	12.5.2.1 Client Server Response Time Performance	X	X			
	12.5.2.2 Data Access Retrieval and Transmission Performance	X	X			
12.5.3 ECS Sizing, Evolution, and Growth	12.5.3.1 Accommodation of ECS Expansion Analysis	X	X	X		
	12.5.3.2 ECS Growth and Evolution Adequacy Analyses	X	X	X	X	X
12.5.4 ECS Testability and Overall Capabilities	12.5.4.1 Test Support in an Operational DAAC	X	X			

7.6.1 LaRC Test Procedure Roadmap

This section provides a listing of tables from the Appendices to this document, that cross reference test sequences or procedures to each of the following:

External Interfaces (Appendix A) - The left column of this table lists each interface external to the Release A ECS LaRC DAAC. In the right column is a list of test sequences which contains tests involving that external interface.

Operational Scenarios (Appendix B) - This table lists each of the operations scenarios from the Operations Scenarios for the ECS Project: Release A (DID 605) in the left column, and in the right column a list of test sequences which contains tests which use that scenario as part of the procedure(s) in that sequence.

LaRC H/W (Appendix C) - This table lists each piece of hardware at the Release A ECS LaRC DAAC in the left column, and in the right column a list of test procedures which use that hardware as part of the procedure(s).

M&O Procedures (DID 611) (Appendix D) - This table lists each of the maintenance procedures from the Maintenance and Operations Procedures (DID 611) in the left column, and in the right column a list of test procedures which use that procedure.

7.7 Test Conduct

Test conduct is the execution of the approved test procedures in the officially approved and controlled test configuration. ATO test conduct takes place at the LaRC ECS DAAC on a fully approved and configured release baseline as approved at the CSR.

7.7.1 Test Direction

All formal tests are conducted under the direction of the Test Conductor who has direct authority regarding all aspects of the execution of that test. This authority includes the assignment of priority to NCRs, NCR disposition, and the NCR's impact on ongoing testing. The step-by-step details of non-conformance reporting and software configuration management is described in the Software Nonconformance Reporting and Corrective Action System Process Project Instruction (SD-1-014) and the Software Development Handbook Project Instruction (CM-1-025).

Authority is vested in the Test Conductor by the Project or Release Manager, but may be further delegated at specific times (off-shift) and/or sites or during his absence. Where activities involve more than one site, this delegation of authority is key. The local test conductor needs autonomy, but also needs centralized guidance. For further information concerning duties of other test participants, see the Verification Plan (DID 401/VE1).

7.7.2 Test Schedule Management

The Test Conductor is responsible for the scheduling and dispatch of test resources and activities. In consultation with concerned parties, he/she determines what portion of the test is executed on a given day. During this process all pertinent factors are examined: availability of system resources, conflicts with other activities and inherent test sequencing concerns. During the planning and preparation phases the overall verification activity was divided into scenarios and sequences to provide flexibility in scheduling. The sequences comprising a scenario provide a manageable increment of the test with clear starting and stopping points. The test procedure is the most basic increment of execution. It is crucial that the Test Conductor be cognizant of dependencies within the test structure (e.g., does the current procedure require that another procedure has run successfully to establish initial data conditions?). These are documented in the test procedure itself, but the Test Conductor must have broader understanding and control of the test environment at all times to deal effectively with test scheduling issues.

When a given test procedure is scheduled for execution, the Test Conductor ensures that all necessary materials and supporting data are present. Included and key to this activity are copies of the applicable procedures, either hard copy or access to on-line soft copy. Specially labeled copies of the procedures are distributed to each participant actually performing the test. Observers receive copies so they may follow the execution. The copies of the test procedures held by those performing the test and the Test Conductor's copy is collected and becomes part of the official record of the test. As such, on the day of the test they are marked, by hand, to indicate date, time, operator position (or role) and who is using the procedure.

Before the beginning of a scheduled test period a pre-test meeting is held by the Test Conductor. The Test Conductor determines the need for both regularly scheduled and Ad Hoc meetings. The purpose of the pre-test meetings is to:

- a. Brief the activities to be performed
- b. Assess readiness to proceed with those activities
- c. Discuss any special conditions for the conduct of the activity
- d. Apply any last minute markups to the test procedures to be used. If there are any, they are made, initialed and dated.

All changes to test procedures, either during planning, execution or post test analysis, are approved and initialed by the Test Conductor. Changes to test procedures are either temporary or permanent. Temporary changes are those that are made to accommodate a singular event or circumstance. Temporary changes generally apply to only one execution of the test procedure and are made to document the deviation for reporting purposes. For temporary changes the procedures are marked up in blue or black ink. Permanent procedure changes are made to correct errors in the procedures or insert new steps which are executed every time the test is re-run. Permanent changes are marked up in red ink and are reflected in the next document release which contains that particular test procedure.

7.7.3 Test Execution

The test begins under the control of the Test Conductor or a designated authority. Team participants follow, exactly, the instructions written in the procedures. In some cases these procedures have an inherent timeline that is critical to the success of the activity. In these cases the procedures have, for each step or group of steps, a time tag telling when they should be performed. The Test Conductor coordinates the pacing of these steps by providing synchronized time sources to all participants. In other cases, the procedures have self-contained pacing instructions. These may instruct the test participant to wait until directed to proceed with a given activity.

The test procedures specify what data is to be collected as the test is executed. This may include spaces where data is to be entered into the procedure itself to capture results or to record the time it took to perform a given activity. All entries requested must be entered in blue or black ink.

7.7.4 Unscheduled Events During Test Execution

Problems encountered which interrupt or prevent the execution of the test procedures might include the following:

- a. Failure of the system to perform as specified in the procedure.
- b. Inability to perform the next step due to, for instance, missing data. An example is: "Select an ASTER image dated 9/11/98".
- c. Critical software failure.
- d. Hardware, communications, or special test equipment failure.
- e. An error in following the procedure. Steps might be inadvertently skipped. This may be noticed by the operator or might cause a more overt problem already listed above.
- f. Unexpected actions by others that affect the test environment.

It is the responsibility of the test participants to determine if problems have occurred. If there is doubt, they immediately address their concerns to the Test Conductor. The Test Conductor is, likewise, responsible to carefully follow the conduct of the test constantly, looking for deviations or anomalies. Actions to be taken in response to unscheduled events are detailed in the Procedure for Control of Unscheduled Activities During Verification for the ECS Project (DID 404/VE1).

7.7.5 Test Conduct Documentation

As the test proceeds, significant events are recorded in test logs. Each test team participant keeps a log. The Test Conductor keeps a master test log which include the information recorded in the individual logs.

Upon completion of a session of testing, the Test Conductor directs the securing of all necessary information. Material to be collected/controlled includes:

- a. All test procedures (including markups)
- b. Test Logs (including individual logs and notes and the master test log)
- c. Materials produced by the system under test (e.g. printouts, screen dumps)
- d. Post test file dumps. This may involve collection of actual media to perform the saves. If instead, the dumps are recorded on disk, they should be placed under CM control by saving them within the ClearCase tool. In this case, a record of the data set names and version must be maintained.
- e. NCRs written during the testing period. Note: Some problems encountered are obvious NCRs and can be written immediately. Other problems are discussed at the post test review meeting described below. ECS policy is to write NCRs freely and dispose of duplicates or erroneous submissions after review.

7.7.6 Daily Test Reviews

At the completion of each day of testing, a post test review meeting is held to review the events of the day. If testing involves simultaneous activities at multiple sites, as in the end-to-end scenarios, this post test review meeting is held as a teleconference. During this meeting, overall testing status is assessed. Problems encountered during the day are reviewed. This is accomplished by reviewing all test procedures and test logs. Each problem is discussed and assessed. A determination of the need to create a Nonconformance Report is made. If an NCR is opened, a team member is assigned to enter it in the NRCA system. The status and priority of the problem is determined, if possible. Any necessary follow-up investigation is assigned, including imposition of a due date. A daily log of statistics is kept citing the number of test cases executed, number of Nonconformance Reports filed, their classification and other test metrics for status reporting purposes. Specific metrics relating to test execution are developed, reviewed, and approved prior to the start of test conduct activities.

Finally, a determination of success for the day's activities is made and discussed. This guides the planning for the next session's activities. Based on this assessment, any changes in the scheduled activities for the next day is evaluated and the test schedules and procedures updated appropriately. Generally, complete success in meeting the objectives for a day's testing results in the uninterrupted continuation of the planned test activities. Unexpected interruptions to testing results in the rescheduling of test activities and resources to minimize the impact to the testing effort.

7.8 Acceptance Test Schedule

Figure 7-5 depicts the acceptance test schedule for the ECS Release A. During the conduct of acceptance testing, ATO conducts a daily acceptance test status meeting to apprise EDC management personnel of on-going acceptance test schedules and status.

7.9 Release Readiness Review (RRR)

Before ECS Release A is formally approved for use, a RRR is held to validate the utility and suitability of the release. This review focuses on the degree to which requirements for Release A have been satisfied. The current status of interfacing elements and the user support infrastructure within the ECS is reviewed to ensure that Release A actually improves overall system operation. In addition to a summary of new capabilities and changes since the Ir1 release, the data products scheduled in the ECS CDRL for delivery prior to the RRR, shown in Figure 7-6, are available for review.

The results of the Physical Configuration Audits (PCAs), conducted at each applicable operational site, are presented at RRR. Witnessed by the Quality Office and ESDIS, the PCAs are conducted by the ECS Project Team and led by the CMO. The results of the Functional Configuration Audits (FCAs), accomplished by review of Acceptance Test results, are presented at RRR. The FCA's are performed by the Quality Office and ESDIS. Both PCA and FCA results are documented and delivered in CDRL 081, Audit Report (DID 506/PA3).

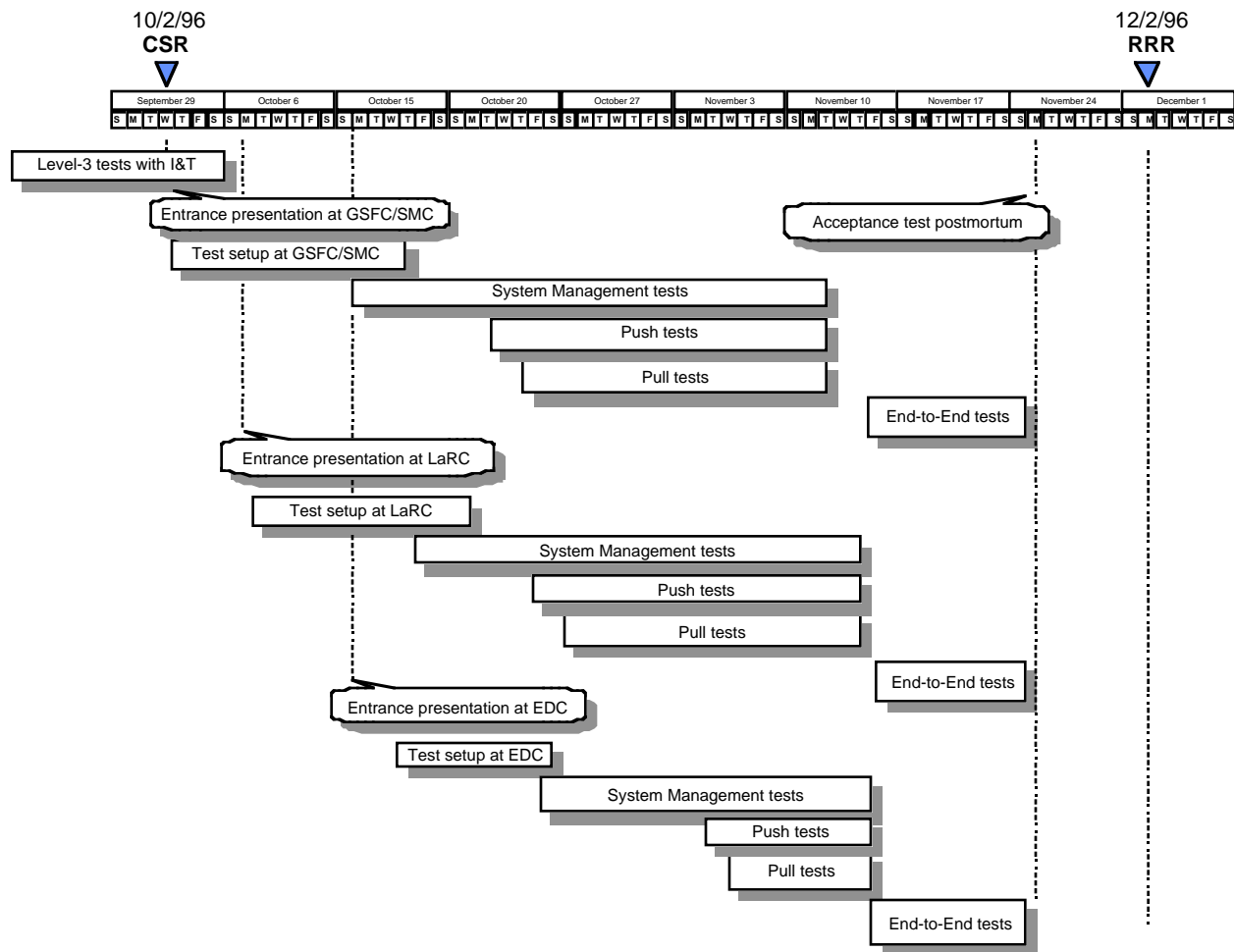
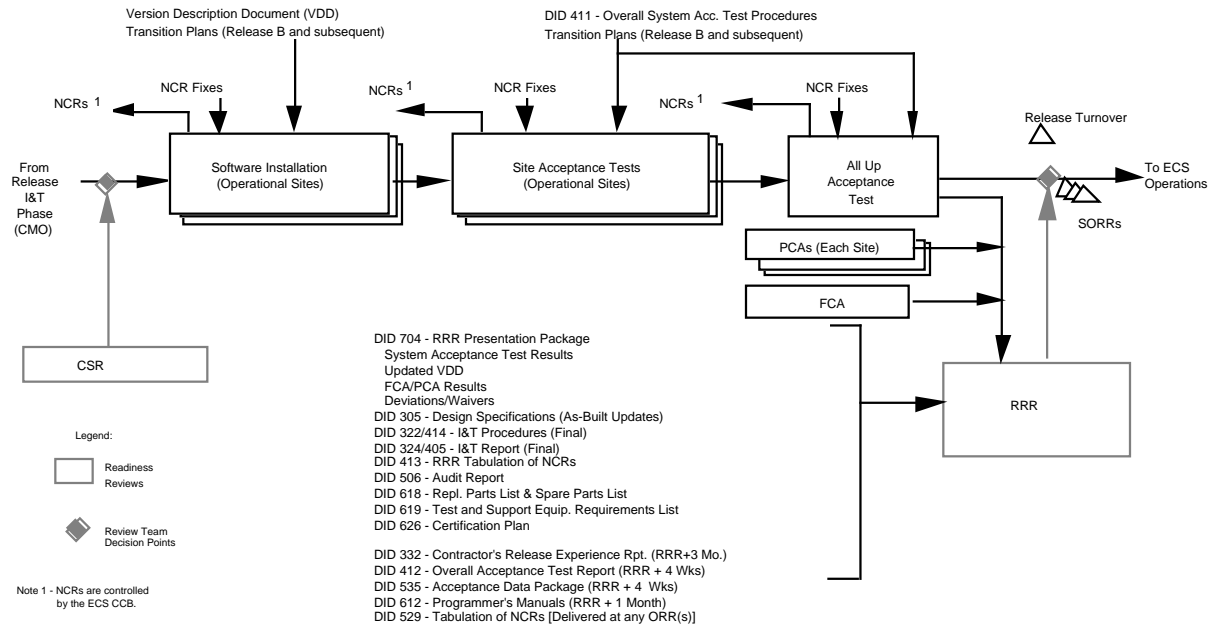


Figure 7-5. Acceptance Test Schedule



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Figure 7-6. Release Readiness Review Material

8. System Management Scenario Group

The objective of the System Management Scenario Group is to demonstrate the ability of ECS system facilities and infrastructure to perform ongoing operations at the levels required for ECS Release A. The site is examined to provide assurance to the AT team of its readiness to support further acceptance testing, based on its performance under the scrutiny of the ECS Site Commission Scenario. The LaRC ECS DAAC Interfaces with the SMC, which conducts enterprise monitoring and coordination of operations for ECS managed resources. The LaRC ECS DAAC and SMC use these Interfaces to perform configuration management, security and accountability; and participate in system level problem resolution (trouble tickets). These functions use these Interfaces to provide the site management access to SMC management services and system wide data. The site-level configuration management and performance management capability is evaluated. Ancillary capabilities (fault management, security functionality, accounting and accountability, and report generation) are reviewed for functional completeness and for acceptable operation at the site, and in the total ECS system context.

8.1 ECS Site Commission Scenario

This scenario familiarizes the M&O team with the site by acquainting the staff with site procedures and the operation and care of the site's ECS equipment. It introduces the staff to the ECS documented procedures, a demonstration of how each ECS site is "powered up", how various start-up and shutdown procedures are done, and how recovery from an abnormal shutdown is accomplished. It also demonstrates the types and availability of ECS maintenance tools and the application of approved procedures for their use. Assessment of the ECS facility interface capability includes evaluation of both external and internal interfaces.

Through a demonstration of simulated events and a policy and procedures review, confidence is built in each site's ability to successfully respond to scheduled and unscheduled events. As a final step, the AT team estimates the site's readiness to support further acceptance testing, based on the site's performance during this condensed, comprehensive overview of the systems operation.

8.1.1 M&O Procedures Review and Confidence Test Sequence

This sequence confirms the existence and completeness of documented M&O policies and procedures and confirms the correct hardware and software configuration items of the ECS site.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DMS, DPS, DSS, INS, & ISS. Refer to Appendix D for additional detail.

External Interfaces: There are no external Interfaces needed for this sequence.

Operator Positions: There are no operator positions needed for this sequence.

Operational Scenario: There are no operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A (605/OP1), used during this sequence of tests.

Test Dependencies: There are no test dependencies for this sequence.

8.1.1.1 ECS Sites Nominal Operations Policy and Procedures Review

TEST Procedure No. A080110.010\$L	Date Executed:	Test Conductor:
Title:	ECS Sites Nominal Operations Policy and Procedures Review	
Objective:	This test verifies the existence, accessibility and usability of documented operational and maintenance policies and procedures.	
Requirements	Acceptance Criteria	
SMC-2605#A	<p>This requirement is verified through demonstration.</p> <p>The LSM shall support the site and element in implementing ESDIS Project policies and procedures received from the SMC covering the following areas, at a minimum:</p> <ul style="list-style-type: none">a. Element responsibility and authorityb. Resource managementc. Fault recoveryd. Testinge. Simulationf. Maintenanceg. Logisticsh. Performance evaluationi. Trainingj. Quality and product assurancek. Inventory managementl. System enhancementsm. Finance managementn. Administrative actionso. Security <p>The documented LSM MSS policies and procedures for the LaRC ECS DAAC must be available for use at the LaRC ECS DAAC.</p>	
Test Inputs: <u>Release A Version Description Document</u> (814/) <u>Mission Operation Procedures for the ECS Project</u> (611/OP3)		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Confirms that configuration management has verified the <u>Release A Version Description Document</u> (DID 814) includes the following document: <u>Mission Operation Procedures for the ECS Project</u> (DID 611/OP3)	
20	Expected Result: Certified DID 611/OP3 is included in <u>Release A Version Description Document</u> (DID 814).	
30	Tester: Inspects DID 611/OP3 to verify that the following items are addressed: a. Site or element responsibility and authority b. Resource management c. Fault recovery d. Testing e. Simulation (TBD) f. Maintenance g. Logistics h. Performance evaluation i. Training j. Quality and product assurance k. Inventory management l. System enhancements m. Finance management n. Administrative actions o. Security	
40	Expected Result: The following items are addressed in DID 611/OP3: a. Site or element responsibility and authority b. Resource management c. Fault recovery d. Testing e. Simulation - Section TBD f. Maintenance g. Logistics h. Performance evaluation i. Training j. Quality and product assurance k. Inventory management l. System enhancements m. Finance management n. Administrative actions o. Security	
Data Reduction and Analysis Steps: The document DID 611/OP3 is inspected and SMC policies and procedures are verified.		
Signature:		Date:

8.1.1.2 ECS Hardware and Software Configuration Items Review

TEST Procedure No.: A080110.020\$L	Date Executed:	Test Conductor:
Title: ECS Hardware and Software Configuration Items Review		
Objective: This test verifies the ECS hardware and software configuration items are on the system..		
Requirements	Acceptance Criteria	
SMC-2515#A	This requirement is verified through test. The LSM shall provide configuration management for at least the operational hardware, system software, and scientific software within its element and for the migration of enhancements into the operational system. The Tester verifies that the Baseline Manager contains a version history of configuration controlled resources according to each site's operational baseline as described in the <u>Release A Version Description Document</u> (814)	
Test Inputs: <u>Release A Version Description Document</u> (814)		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Check with configuration management personnel responsible for the LaRC ECS DAAC that the <u>Release A Version Description Document</u> (814/) lists all hardware and software configuration items configured into the system.	
20	Expected Results: Configuration management personnel certify that the <u>Release A Version Description Document</u> (814/) contains all the hardware and software configuration items present and properly configured into the LaRC ECS DAAC system.	
30	Computer Operator: Log into the MSS Local Management Server and execute the Baseline Manager application.	
40	Expected Results: Baseline Manager application displays on the screen.	
50	Computer Operator: Using the list of hardware and software configuration items listed in the <u>Release A Version Description Document</u> (814/), access and view each configuration item stored within the Baseline Manager	
60	Expected Results: Each of the configuration items listed in the <u>Release A Version Description Document</u> (814/) contains <ul style="list-style-type: none"> a. the current version; b. the current version's specifications and technical, operations, and maintenance documentation; c. the specification and technical documentation history; d. the "level of assembly" representation of the components; and e. the version history. 	
70	Computer Operator: Exit the Baseline Manager.	
80	Expected Results: The screen returns to the UNIX prompt.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.2 Site Start-up Sequence

This sequence verifies the ECS can be powered up using normal cold-start procedures, operated successfully for fifteen minutes (or less if approved by the AT test conductor) and shutdown using normal shutdown procedures. The ECS is subsequently restarted to verify the system's ability to perform normal "warm restart" procedures.

During the fifteen minutes of operational time, specific configuration changes are input to the system. After normal shutdown and restart, the observed system configuration is compared to the configuration prior to shutdown to verify the preservation of system configuration parameters.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DMS, DPS, DSS, INS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: There are no external interfaces needed for this sequence.

Operator Position(s): The operator position from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence is listed:

DAAC System Administrator

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that was used to develop tests in this sequence of tests are listed:

ECS System Shutdown/Startup Scenario (Section 3.1.1)

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.1.2.1 Site Startup Confidence Test

TEST Procedure No.: A080110.040\$L	Date Executed:	Test Conductor:
Title:	Site Startup Confidence Test	
Objective:	The purpose of this test is to demonstrate a normal startup, operations and shutdown of the ECS site.	
Requirements	Acceptance Criteria	
EOSD3000#A	<p>This requirement is verified through demonstration.</p> <p>The ECS shall provide for security safeguards to cover unscheduled system shutdown (aborts) and subsequent restarts, as well as for scheduled system shutdown and operational startup.</p> <p>System startup and shutdown must be accomplished using the cold startup and normal shutdown procedures documented in the <u>Mission Operation Procedures for the ECS Project</u> (611/OP3).</p> <p>This test does not verify unscheduled system shutdown and subsequent restarts. This is verified in 8.1.4 Site Shutdown/ Recovery Sequence.</p>	
Test Inputs: <u>Mission Operation Procedures for the ECS Project</u> (611/OP3)		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	Perform an ECS cold startup in accordance with procedures documented in the Operator's Manual (611/OP3).	
10	System Administrator: Powers on the system components.	
20	Expected Results: System components respond. This is conveyed by power on indicator lights.	
30	System Administrator: Initializes the script to startup the system.	
40	Expected Result: Execution of the Startup Script. MSS Agent is initialized. MSS Agent calls the Client Startup Script. Client software is started. MSS Agent calls the Data Archive Subsystem Startup Script. Data Archive Subsystem is started. MSS Agent calls the Ingest Startup Script. Ingest Subsystem is started. MSS Agent calls the Data Server Startup Script. Data Server Subsystem is started. MSS Agent calls the PDPS Startup Script. PDPS Subsystem is started. MSS Agent opens the gateway to allow for incoming requests	
50	System Administrator: Initializes HP OpenView.	
60	Expected Result: HP OpenView displays on the screen.	
70	System Administrator: Using the system management agent, configure the display to monitor a specific set of software and hardware elements. Save the configuration.	
80	Expected Results: The system management agent stores the new display configuration.	
90	System Administrator: Monitors HP OpenView to insure that all of the subsystems have been initialized.	
100	Expected Results: HP OpenView shows that each of the subsystems are up and running without any problems. This is conveyed by HP OpenView by a green icon representing each of the components.	
110	System Administrator: Sends out a message to the Computer Operators and the Resource Manager notifying them that the system is up and running.	
120	Expected Results: A pop up message is displayed on the Computer Operators' and the Resource Manager's screens.	
130	System Administrator: Monitors the system for 15 minutes.	

140	Expected Results: HP OpenView shows that each of the subsystems are up and running without any problems. This is conveyed by HP OpenView by a green icon representing each of the components.	
150	System Administrator: Sends out a message to the Computer Operators and the Resource Manager notifying them that the system is going down in T-15 minutes.	
160	Expected Results: A pop up message is displayed on the Computer Operators' and the Resource Manager's screens.	
170	System Administrator: Sends out a message to the Computer Operators and the Resource Manager notifying them that the system is going down in T-10 minutes.	
180	Expected Results: A pop up message is displayed on the Computer Operators' and the Resource Manager's screens.	
190	System Administrator: Sends out a message to the Computer Operators and the Resource Manager notifying them that the system is going down in T-1 minute.	
200	Expected Results: A pop up message is displayed on the Computer Operators' and the Resource Manager's screens. At Shutdown the system no longer allows incoming requests.	
210	System Administrator: Waits for all jobs to complete. If a job running will take longer than 10 minutes to complete the job will be stopped and the originator will be notified. Execute a "ps" command to verify that all processes have completed.	
220	Expected Results. Response to "ps" command denotes that all jobs have completed.	
230	System Administrator: Shuts down the PDPS.	
240	Expected Results: System shuts down the PDPS.	
250	System Administrator: Monitors HP OpenView to see when the PDPS has shutdown.	
260	Expected Results: The HP OpenView icon for the PDPS turns red denoting the PDPS is shutdown.	
270	System Administrator: Shuts down the Data Server.	
280	Expected Results: System shuts down the Data Server.	
290	System Administrator: Monitors HP OpenView to see when the Data Server has shutdown.	
300	Expected Results: The HP OpenView icon for the Data Server turns red denoting the Data Server is shutdown.	
310	System Administrator: Shuts down the Ingest Subsystem.	
320	Expected Results: System shuts down the Ingest. Subsystem	
330	System Administrator: Monitors HP OpenView to see when the Ingest Subsystem has shutdown.	
340	Expected Results: The HP OpenView icon for the Ingest Subsystem turns red denoting the Ingest is shutdown.	
350	System Administrator: Shuts down the Data Archive Subsystem.	

360	Expected Results: System shuts down the Data Archive Subsystem.	
370	System Administrator: Monitors HP OpenView to see when the Data Archive Subsystem has shutdown.	
380	Expected Results: The HP OpenView icon for the Data Archive Subsystem turns red denoting the Data Archive is shutdown.	
390	System Administrator: Shuts down the Client software.	
400	Expected Results: System shuts down the Client software.	
410	System Administrator: Monitors HP OpenView to see when the Client software has shutdown.	
420	Expected Results: The HP OpenView icon for the Client software turns red denoting the Client software is shutdown.	
430	System Administrator: Shuts down the MSS Subsystem.	
440	Expected Results: System shuts down the MSS Subsystem and the UNIX prompt appears.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.2.2 Site Restart Including Introduction of Previous Results

TEST Procedure No.: A080120.010\$L	Date Executed:	Test Conductor:
Title:	Site Restart Including Introduction of Previous Results	
Objective:	This test demonstrates the ability of the ECS to perform a warm restart and demonstrates that configuration inputs from the prior operational state are still active following a shutdown and restart process.	
Requirements	Acceptance Criteria	
EOSD3000#A	<p>This requirement is verified though demonstration.</p> <p>The ECS shall provide for security safeguards to cover unscheduled system shutdown (aborts) and subsequent restarts, as well as for scheduled system shutdown and operational startup.</p> <p>The ECS must perform a warm restart and demonstrate the return to the preserved configuration from the previous operational state.</p> <p>This test does not verify “unscheduled system shutdown (aborts) and subsequent restarts” and “scheduled system shutdown. They are verified in 8.1.4 Site Shutdown/Recovery Sequence and 8.1.2.1 Site Startup Confidence Test respectively.</p>	
Test Inputs: <u>Mission Operation Procedures for the ECS Project</u> (611/OP3)		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	Perform an ECS warm restart in accordance with procedures documented in the Operator's Manual (611-CD-001-001).	
10	System Administrator: Initializes the script to startup the system.	
20	Expected Result: Execution of the Startup Script. MSS Agent is initialized. MSS Agent calls the Client Startup Script. Client software is started. MSS Agent calls the Data Archive Subsystem Startup Script. Data Archive Subsystem is started. MSS Agent calls the Ingest Startup Script. Ingest Subsystem is started. MSS Agent calls the Data Server Startup Script. Data Server Subsystem is started. MSS Agent calls the PDPS Startup Script. PDPS Subsystem is started. MSS Agent opens the gateway to allow for incoming requests	
30	System Administrator: Initializes HP OpenView.	
40	Expected Result: HP OpenView displays on the screen.	
50	System Administrator: Verifies that the saved configuration is displayed on the screen.	
60	Expected Results: HP OpenView shows that each of the subsystems are up and running without any problems. This is conveyed by HP OpenView by a green icon representing each of the components.	
70	System Administrator: Sends out a message to the Computer Operators and the Resource Manager notifying them that the system is up and running.	
80	Expected Results: A pop up message is displayed on the Computer Operators' and the Resource Manager's screens.	
90	System Administrator: Monitors the system for 15 minutes.	
100	Expected Results: HP OpenView shows that each of the subsystems are up and running without any problems. This is conveyed by HP OpenView by a green icon representing each of the components.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.3 Site Operations Sequence

This sequence is not applicable for the LaRC ECS DAAC Volume of the Acceptance Test Procedures document for Release A.

8.1.4 Site Shutdown/Recovery Sequence

This sequence evaluates the capability of the ECS site to perform documented emergency shutdown procedures. This sequence also evaluates the capability of the ECS site to recover from the abnormal shutdown and to provide continued performance, albeit in a degraded mode, during a device failure. A device failure is simulated during the restart process by forcing the RAID storage device to go off-line.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, DMS, DPS, DSS, INS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: There are no external interfaces needed for this sequence.

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence are listed:

DAAC Computer Operator

DAAC System Administrator

DAAC Resource Manager

DAAC Production Monitor

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that was used to develop tests in this sequence of tests are listed:

Computer System Administration Backup & Restore/recovery (Section 3.1.2)

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080140.010\$L A080150.010\$L A080150.020\$L	A080170.020\$L	Run A080170.020\$L prior to any test in this sequence.
A080140.010\$L A080150.010\$L A080150.020\$L	A080180.090\$L	Run A080180.090\$L prior to any test in this sequence.
A080150.010\$L	A080620.040\$L	Run A080620.040\$L prior to A080150.010\$L

8.1.4.1 Emergency and Other Abnormal Shutdown

TEST Procedure No.: A080140.010\$L	Date Executed:	Test Conductor:		
Title: Emergency and Other Abnormal Shutdown				
Objective: This confirms that the site's standard procedures contain methodology for responding to catastrophic situations that require immediate site shutdown and for other types of abnormal shutdown such as system critical equipment failure.				
Requirements		Acceptance Criteria		
EOSD3000#A		This requirement is verified through demonstration. The ECS shall provide for security safeguards to cover unscheduled system shutdown (aborts) and subsequent restarts, as well as for scheduled system shutdown and operational startup. The emergency shutdown of the ECS must be accomplished using the procedures documented in the Operator's Manual. This test does not verify "subsequent restarts, as well as for scheduled system shutdown and operational startup", are not verified in this procedure and are verified in 8.1.2 Site Startup Sequence		
Test Inputs: <u>Mission Operation Procedures for the ECS Project (611/OP3)</u>				
Data Set Name	Data Set ID	File Name	Description	Version
		BadCfgFile	Bad Configuration File	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Computer Operator: Perform an emergency shutdown in accordance with procedures documented in the Operator's Manual (611/OP3).	
20	Expected Results: The system is in the shut down state where each subsystem is offline. A more detailed description of the shutdown state will be incorporated upon completion of the Operator's Manual (611/OP3).	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.4.2 Recovery From Catastrophic Emergency Shutdown

TEST Procedure No.: A080150.010\$L	Date Executed:	Test Conductor:
Title:	Recovery From Catastrophic Emergency Shutdown	
Objective:	The purpose of this test is to verify the ECS site can recover from an emergency shutdown and that the FSMS can continue to provide service in the event of a device failure.	
Requirements	Acceptance Criteria	
DADS1540#A	<p>This requirement is verified through demonstration.</p> <p>In case of corruption or catastrophic failure, capabilities for recovering the file directory shall be provided.</p> <p>The DADS must be able to restore files after a catastrophic failure.</p> <p>This test does not verify data corruption. This is verified in 8.1.4.3 Recovery From Abnormal Non-Catastrophic Shutdown.</p>	
EOSD2990#A	<p>This requirement is verified through demonstration.</p> <p>The ECS elements shall support the recovery from a system failure due to a loss in the integrity of the ECS data or a catastrophic violation of the security system.</p> <p>The system must be able to restore files following a simulated catastrophic violation of the security system.</p> <p>This test does not verify "...the recovery from a system failure due to a loss in the integrity of the ECS data...". This is verified 8.1.4.3 Recovery From Abnormal Non-Catastrophic Shutdown.</p>	
EOSD3000#A	<p>This requirement is verified through demonstration.</p> <p>The ECS shall provide for security safeguards to cover unscheduled system shutdown (aborts) and subsequent restarts, as well as for scheduled system shutdown and operational startup.</p> <p>The system must be able to restore files following a simulated catastrophic violation of the security system.</p> <p>This test does not verify "unscheduled system shutdown (aborts)" and "scheduled system shutdown and operational startup." They are verified in 8.1.4.1 Emergency and Other Abnormal Shutdown and 8.1.2 Site Startup Sequence respectively.</p>	
Test Inputs: <u>Mission Operation Procedures for the ECS Project (611/OP3)</u>		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	NOTE A080620.040\$L must be run prior to this test.	
10	Computer Operator: Attempts to bring the system back on-line, but discovers that some key files are missing.	
20	Expected Results: A file listing of the system does not contain the key files.	
30	Computer Operator: Determines that a full restore of the system files from a previous backup will fix the problem. Enters the commands to initialize the scripts to begin the restore.	
40	Expected Results: System initializes the scripts to restore the software.	
50	Computer Operator: Invokes the word processor and moves to the backup directory, to review the log file associated with the backup being restored.	
60	Expected Results: System displays the log file on terminal.	
70	Computer Operator: Selects the backupxxxxxx.log file (where xxxxxx represents the month, day, and year of the backup).	
80	Expected Results: System displays appropriate log file.	
90	Computer Operator: Prints out a copy of the log file.	
100	Expected Results: Prints the log file.	
110	Computer Operator: Exits the log file directory.	
120	Expected Results: System returns to word processor. Restore concludes and an indicator is returned to the operator.	
130	Computer Operator: From the word processor that is already up, opens the file pull down menu and selects open. Then, opens the associated QA report.	
140	Expected Results: System displays the QA report.	
150	Computer Operator: Compares the QA report with the log file from the backup that was restored.	
160	Expected Results: the QA report and the log file list the same files.	
170	System Administrator: Initializes the script to startup the system as described in the Operator' Manual (611-CD-001-001).	
180	Expected Results: HP OpenView shows that each of the subsystems are up and running without any problems. This is conveyed by HP OpenView by a green icon representing each of the components.	

Data Reduction and Analysis Steps:

- a. The following are secured for analysis at the close of the procedure:
 1. Backup log.
 2. QA report.
- b. Verify the QA report confirms the contents of the files restored from the archive media (listed on the backup log).

Signature:**Date:****8.1.4.3 Recovery From Abnormal Non-Catastrophic Shutdown**

TEST Procedure No.: A080150.020\$L	Date Executed:	Test Conductor:
Title:	Recovery From Abnormal Non-Catastrophic Shutdown	
Objective:	This test confirms the sites ability to restore files caused by an abnormal non-catastrophic shutdown using standard operational procedures and that the FSMS can continue to provide service in the event of a device failure.	
Requirements	Acceptance Criteria	
DADS1540#A	This requirement is verified through demonstration. In case of corruption or catastrophic failure, capabilities for recovering the file directory shall be provided. The DADS must be able to restore files corrupted by a FSMS failure. This test does not verify catastrophic failures. This is verified in 8.1.4.2 Recovery From Catastrophic Emergency Shutdown.	
DADS1610#A	This requirement is verified through demonstration. The FSMS shall provide for continued performance, albeit in a degraded mode, when a device (e.g., disk or cartridge drive, operator's console) fails. The ECS FSMS must be able to provide continued service to a registered science user during a simulated failure of the RAID storage device.	
DADS1630#A	This requirement is verified through demonstration. At each DADS, tools shall be provided for recovery of data from failed media and devices. The DADS must be able to restore file from a previously made backup of the archive media.	
DADS2276#A	This requirement is verified through demonstration. Each DADS shall have the capability to restore its archive by storing a backup copy of EOS data or backup copy of information required to regenerate the data. The DADS must be able to restore a file(s) from a previously made backup of the archive media.	

DADS2300#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall provide a capability for local and offsite backup/restore of system files.</p> <p>The DADS must be able to restore a file(s) from a previously made backup of the archive media.</p>
DADS2950#A	<p>This requirement is verified through demonstration.</p> <p>In case of failure of the automated system, archive media shall be capable of being manually mounted at each DADS.</p> <p>The archive media resident in storage devices must be manually accessible and mountable.</p>
EOSD2440#A	<p>This requirement is verified through test.</p> <p>Data base integrity including prevention of data loss and corruption shall be maintained.</p> <p>The DADS must be able to restore files corrupted by a FSMS failure.</p>
EOSD2990#A	<p>This requirement is verified by demonstration.</p> <p>The ECS elements shall support the recovery from a system failure due to a loss in the integrity of the ECS data or a catastrophic violation of the security system.</p> <p>The DADS must be able to restore files following a simulated catastrophic failure.</p>
Test Inputs: <u>Mission Operation Procedures for the ECS Project (611/OP3)</u>	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Computer Operator: Executes a simulated FSMS Server Host disc crash. Views HP OpenView.	
20	Expected Result: The LaRC icon in HP OpenView is red.	
30	Computer Operator: Double clicks on the LaRC icon to go down to the next level of submaps.	
40	Expected Result: The LaRC submap displays on the screen. The DRPHW-LaRC-1 icon is red.	
50	Computer Operator: Double clicks on the DRPHW-LaRC-1 icon to go down to the next level of submaps.	
60	Expected Result: The DRPHW-LaRC-1 submap displays on the screen. The disk drive icon is red.	
70	Computer Operator: Tries to write to the disk and fails. Then, determines the disk has failed.	
80	Expected Results: The disk cannot be written to.	
90	Computer Operator: Initiate the archive media recovery utility (Need to research if and how the SQL build master recovery utility or other recovery utilities will be implemented in LaRC Release A).	
100	Computer Operator: Schedules the replacement and restore of the disk with the Resource Manager and the Production Monitor.	
110	Expected Results: Based on the resources needed and the time required to conduct the restore the event is scheduled.	
120	Computer Operator: Notifies all affected users that the system has crashed and a restore is scheduled for 0100. This message also indicates which date the backup that will be used was taken.	
130	Expected Results: System sends e-mail.	
140	Computer Operator: Retrieves the backup which is stored in a different facility. Enters the commands to initialize the scripts to begin the restore.	
150	Expected Results: System initializes the scripts to restore the FSMS Server Host disc.	
160	Computer Operator: Invokes the word processor and selects "Open" from the file pull down menu to review the log file associated with the backup being restored.	
170	Expected Results: System displays the log file on the terminal.	
180	Computer Operator: Selects the Restorexxxxxx.log (where xxxxxx equal the month, day and year).	
190	Expected Results: System displays appropriate log file.	
200	Computer Operator: Prints out a copy of the log file.	
210	Expected Results: Prints the log file.	

220	Computer Operator: Exits the log file directory.	
230	Expected Results: System returns to word processor. Restore concludes and an indicator is returned to the operator.	
240	Computer Operator: Restores the incremental backups taken since the last system backup to bring the system as close to realtime as possible.	
250	Expected Results: The restores conclude and an indicator is returned to the operator.	
260	Computer Operator: From the word processor that is already up, the QA report associated with the restore.	
270	Expected Results: System displays the QA report.	
280	Computer Operator: Compares the QA report with the log file from the backup that was restored.	
290	Expected Results the QA report and the log file list the same files.	
300	Computer Operator: verifies that the system is back up and operational.	
310	Expected Results: HP OpenView shows that the LaRC icon is up and running without any problems. This is conveyed by HP OpenView by a green icon.	
320	Computer Operator: Notifies the affected users that the restore has concluded and that activities that were performed before Day 5 at 1900 may need to be redone.	
Data Reduction and Analysis Steps: a. The following are secured for analysis at the close of the procedure: <ol style="list-style-type: none"> 1. Backup log. 2. QA report. b. Verify the QA report confirms the contents of the files restored from the archive media (listed on the backup log.		
Signature:		Date:

8.1.5 Site Maintenance Sequence

The Site Maintenance sequence verifies, through demonstration, the capability of maintenance and operations (M&O) tools, at LaRC DAAC site. This sequence assures that the M&O services are accessible to the DAAC staff, via the appropriate interfaces, from local or remote terminals. ECS functions requiring an M&O interface are system management, science algorithm integration, product generation, data archiving and distribution, user support services and system maintenance.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DMS, DPS, DSS, INS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interface (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) is listed:

SMC

GSFC DAAC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions (607/OP3) document needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Resource Manager

DAAC Archive Manager

DAAC Computer Operator

DAAC User Services Representative

DAAC Ingest Distribution Technician

Operator Scenario: There are no operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A (605/OP1), used during this sequence of tests.

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.1.5.1 DAAC M&O Interfaces

TEST Procedure No.: A080160.010\$L	Date Executed:	Test Conductor:
Title:	DAAC M&O Interfaces	
Objectives:	Demonstrate that M&O interfaces, provided for LaRC DAAC ECS subsystems are accessible and functioning and that these interfaces are sufficient to support planned operations and maintenance activities. Demonstrate that the M&O interface provides access to on-line services for Accountability, Fault Management, Performance Management, and Report Generation. Demonstrate that other on-line services are available for three aspects of security management network, communications and host processors along with general message exchange services to support E-mail, FTP file access, Bulletin Board, and Virtual Terminal capabilities. Demonstrate that the M&O interface provides access to off-line configuration control services to support Baseline Management, S/W Change Management, Change Request Management, S/W Distribution Management, and S/W License Management. Demonstrate that the M&O interface provides access to off-line resource management services to support Inventory management, Logistics management, Training and Policies & Procedures management using Office Automation tools.	

Requirements	Acceptance Criteria			
EOS D170 3#A	<p>This requirement is verified through demonstration.</p> <p>The system shall provide M&O interfaces which support the functions of:</p> <ul style="list-style-type: none">a. System Management,b. Science Algorithm Integration,c. Product Generation,d. Data Archive/Distribution,e. User Support Services, andf. System Maintenance. <p>M&O interfaces must provide system management functionality with links to Accountability Services, Management Data Access services and Fault Management services. Fault Management Services must provide access to external systems, interfaces with management agents, Performance Management Services, Security services, M&O system management interfaces must include links to CSS and system log.</p> <p>The interfaces must provide access to AI&T team data, and Bulletin Board(s) via ECS workstations using Virtual Terminals. M&O interfaces must provide initialization, recovery and orderly shutdown for the following CIs SPRHW, AITHW, ICLHW, AND PLNHW.</p>			
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version
Accountability Registered Users (principal)				
Access Control List (LaRC)				
Host Authentication database				
User Profiles				
User Audit Trail				
Data Product Audit Trail				
DCE registry database				
Router configuration database				

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	M&O Staff Interface	
	Use MSS services to demonstrate M&O interface capabilities and services.	
10	Computer Operator: Uses MSS M&O interface services and selects an option to create an ECS user account.	
20	Expected Results: System provides screen(s), APIs and Icons which allow Computer Operator to create a principal ECS Science Group Account.	
30	Computer Operator: Uses screen input fields, APIs and Icons to create and submit an ECS Science Principal Group Account.	
40	Expected Results: System provides display, confirmation status indicators and messages verifying that an ECS science principal group account has been created.	
50	Computer Operator: Uses MSS M&O interface services and selects an option to add or update a user's profile information within the newly created ECS Science Principal Group Account.	
60	Expected Results: System provides screen(s), APIs and Icons that allow Computer Operator to add or update user profile information.	
70	Computer Operator: Uses screen input fields, APIs and Icons to add or update and then submit modification(s) to user profile information.	
80	Expected Results: System provides display and confirmation status indicators and messages verifying that user profile information has been added or updated.	
90	User Services Representative: Logs on using the ECS Science Principal Group Account that has been created.	
100	Expected Results: System responds and the User Services Representative is free to begin working within the account.	
110	User Services Representative: Invokes the word processor and selects "Open" from the file pull down menu to review a file.	
120	Expected Results: System displays the file on the terminal.	
130	User Services Representative: Exits the word processor.	
140	Expected Results: Word processor closes and returns to the MSS M&O interface services screen.	
150	Computer Operator: Uses MSS M&O interface services and selects an options to locate and delete a user's profile information from an ECS science users group account.	
160	Expected Results: System provides screen(s), APIs and Icons which allow Computer Operator to delete a user's profile information from a principal ECS science Group account.	

170	Computer Operator: Uses screen input fields, APIs and Icons identify the account and user for deletion. Then submits a delete requests for one user's profile information within an ECS science principal group account.	
180	Expected Results: System provides display and confirmation status messages which indicates that the selected user profile information, within an ECS science principal group account, has been deleted.	
190	Computer Operator: Uses screen input fields, APIs and Icons to identify an ECS science principal account for deletion. Then submits a delete requests for an ECS Science Principal Group Account.	
200	Expected Results: System provides screen(s), APIs and Icons which allow Computer Operator to delete a principal ECS Science Group Account.	
210	Computer Operator: Uses screen input fields, APIs and Icons to identify the ECS science principal group account for deletion. Then submits a delete request for one ECS science principal group account.	
220	Expected Results: System provides display and confirmation status messages which indicates that the selected ECS science principal group account, has been deleted.	
230	Computer Operator: Use M&O interface services to demonstrate capability to construct and execute an inquiry for all profile information for a principal ECS science user group.	
240	Expected Results: System provide screen(s), APIs, data input fields and Icons that allow Computer Operator to formulate and submit an inquiry for a specific user's profile information.	
250	Expected Results: System provides display and confirmation status for the user profile inquiry. User profile information consist of: User ID, name, home DAAC, contact phone number(s) e-mail information, organization, research field, affiliation, sponsor, project name, Principal Investigator, alternate mail address, account number, billing information, privilege levels and creation and expiration dates.	
260	Computer Operator: Uses MSS M&O interface services and selects options to perform an inquiry for a users order status.	
270	Expected Results: System provide screen(s), APIs, data input and Icons that allow Computer Operator to input an inquiry for a user's order status.	
280	Expected Results: System provides display, confirmation status messages and order status data. Order status information consist of: user id, name and address, distribution format, distribution lists, media, size, granule information, home DAAC, ship and billing information, file name(s), submission dates and times, finish date and time, status time of last update.	

290	Expected Results: System reruns Order status information containing user id, name and address, distribution format, distribution lists, media, size, granule information, home DAAC, ship and billing information, file name(s), submission dates and times, finish date and time, status time of last update.	
300	Computer Operator: Demonstrate M&O interface capability to formulate and execute an inquiry to acquire a user's account History.	
310	Expected Results: System provide screen(s), APIs, data input fields and interactive Icons at the accountability services interface that allow Computer Operator to formulate and submit an inquiry for a specific user's account History.	
320	Expected Results: System provides display, confirmation status messages and account history data. Account History consist of: Pending requests, approved requests, subsets of registered users, and subsets of user profile information within principal ECS user groups.	
330	Archive Manager: Demonstrate M&O Interface capability to formulate and execute an inquiry to acquire a user's account status.	
340	Expected Results: System provide screen(s), APIs, data input fields and interactive Icons at the M&O Interface services interface that allow Computer Operator to formulate and submit an inquiry for a specific user 's account Status.	
350	Use M&O Staff interface to demonstrate Accountability Manager Application Services to perform LaRC User Registration.	
360	Archive Manager: Demonstrate M&O staff interface capability to Create user profile information.	
370	Expected Results: System provide screen(s), APIs, data input fields and interactive Icons at the M&O interface that allow Computer Operator to create a specific user's profile.	
380	Archive Manager: Demonstrate M&O Staff interface capability to modify user profile information.	
390	Expected Results: Demonstrate M&O staff interface capability to construct a query to audit the order Status, specify time period and format for a principal ECS science user group.	
400	Operations Supervisor: Demonstrate M&O staff interface capability to delete user Profile information	
410	Expected Results: System provides status messages, and reports/Displays indicating that identified user profile information is deleted from active profile database. Attempts to acquire resource usage or request status will result in audit trail and log entries indicating that user(s) profile information is not available.	
420	Use M&O Staff Interface to access and demonstrate Accountability Manager Application Service that includes access to management Data Access interface to support Audit Trail activity	

430	Operations Supervisor: Demonstrate accountability manager interface capability to construct a query to audit the order status, specify time period and format for a principal ECS science user group	
440	Expected Results: System provides data audit trail reports and displays. Displays/Reports consists of data provided to uses. Reports are ordered by data type. Information contains unique identifiers of serve transaction and/or request(s), host address, date(s) of request(s), time of request(s), and brief description of system access activities, i.e., process or application initiating request, start actions end actions, version information and unique ID of service(s).	
450	Operations Supervisor: Demonstrate accountability manager interface capability to construct a query to audit the account history, specify time period and format for a user within a principal ECS science users group.	
460	Expected Results: System provides user audit trail reports and displays. Displays/Reports consists of history of registered user data detailing unique identifiers of serve transaction and/or request(s), host address, date(s) of request(s), time of request(s), and brief description of system access activities, i.e., process or application initiating request, start actions end actions, version information and unique ID of service(s).	
470	Archive Manager: Demonstrate accountability manager interface capability to execute a query for an audit of user's account status, specify time period and format for a user within a principal ECS Science Users Group.	
480	Expected Results: System provides user audit trail reports and displays. Displays/Reports consists of registered user data detailing unique identifiers of serve transaction and/or request(s), host address, date(s) of request(s), time of request(s), and brief description of system access activities, i.e., process or application initiating request, start actions end actions, version information and unique ID of service(s).	
490	Resource Manager: Demonstrate accountability manager interface capability to execute a query to analyze an audit a user's account, specify time period and format for a principal ECS science users group. two part report ordered by 1 or more parameters such as request date range, organization, research field, file name (instrument or event) etc. user audit analysis report consist of: user id, name, e-mail address, organization, research field, affiliation, project, principal investigator. data audit analysis report consist of: product order request history, submission date and time, finish times, file name(s), shipping and billing information, resources utilization.	

500	Expected Results: System returns displays and/or produces reports ordered by 1 or more parameters such as request date range, organization, research field, file name (instrument or event) etc.. user audit contains user audit analysis report consist of: user id, name, e-mail address, organization, research field, affiliation, project, principal investigator, and data audit analysis displays and/or reports containing product order request history, submission date and time, finish times, file name(s), shipping and billing information, resources utilization.	
510	Resource Manager: Use MSS M&O staff interface to demonstrate system management services for policy management using office automation services. (o/a)	
520	Expected Results: System provides access to data base spread sheets, bulletin boards, and web pages of SMC policies and directives	
530	Resource Manager: Use MSS M&O staff interface to demonstrate system management services for fault management using COTS (HP OpenView).	
540	Expected Results: System provides access to an interface for MSS fault management services.	
550	Use MSS M&O staff interface to demonstrate CM services for file access services for ECS management data, science data, science metadata along with site operations for SDPS planning and scheduling information. (CM & file access service)	
560	Expected Results: System provide access to interfaces which facilitate CM services with capabilities to use file access services to acquire ECS management data, science data, science metadata along with site operations for SDPS planning and scheduling information. (CM & file access service)	
570	Resource Manager: Use MSS M&O staff interface to demonstrate services to access CM cots on LaRC DAAC ECS workstation(s) and virtual terminals .	
580	Expected Results: System provides access to an interface for MSS configuration management application services.	
590	Resource Manager: Use MSS M&O staff interfaces to demonstrate CM tool services for ECS s/w change activities.	
600	Expected Results: System provides access to an interface for MSS configuration management application services. (CM)	
610	Resource Manager: Use MSS M&O Interfaces to demonstrate CM tool services for ECS S/W Merge activities.	
620	Expected Results: System provides interface to CM management tools and services which allow Computer Operator acquire and merge builds of ECS software. The software mix can be custom and COTS.	
630	Resource manager: Use MSS M&O Staff Interfaces to demonstrate CM tool services for ECS S/W directory management and updates.	

640	Expected Results: System provides interface to CM management tools and services which allow Computer Operator perform directory maintenance as part of site maintenance activities.	
650	Resource Manager: Use MSS M&O staff Interfaces to demonstrate CM tool services to send and receive e-mail, and update Bulletin Boards. (E-mail, Bulletin Board).	
660	Expected Results: System provides interface to CM management tools and services which allow Computer Operator access e-mail serves and Bulletin board services.	
670	Resource Manager: Use Baseline Management tools/services to acquire ECS S/W licensing information and produce reports for the DAAC's S/W and H/W baseline configuration(s). (Baseline Manager)	
680	Expected Results: System provides interface to CM management tools and services which allow Computer Operator access and perform services site baseline management (XRP II).	
690	Resource Manager: Use MSS M&O Staff Interfaces to demonstrate CM tool services for Change Request Management activities (DDTS).	
700	Expected Results: System provides interface to CM management tools and services which allow Computer Operator access and perform services site chug request management VCATS and ClearCase and, (XRP II).	
710	Ingest Distribution Technician: Use MSS M&O Staff Interfaces to demonstrate system management services for Performance Management.	
720	Expected Results: System provides interface to MSS management application services and tools which allow Computer Operator access and perform Site Performance Management activities (HPOV Perform. MGT Report Gen.)	
730	Use MSS M&O Staff Interfaces to demonstrate services for Trouble Ticketing.	
740	Expected Results: system provides interface to MSS management application services and tools which allow Computer Operator access and perform Trouble Ticket Management activities (Remedy).	
750	DAAC Security Administration Analyst: Use MSS M&O Staff Interfaces to demonstrate services for Security Management.	
760	Expected Results: System provides interface to MSS and CSS management application services and tools which allow Computer Operator to access and perform Site Security Management activities.	
770	Resource Manager: Use MSS M&O Staff Interfaces to demonstrate services for Inventory, Logistics and Maintenance.	
780	Expected Results: TBS	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.5.2 Maintenance of ECS Databases

TEST Procedure No.: A080160.020\$L	Date Executed:	Test Conductor:
Title: Maintenance of ECS Databases		
Objective:	Demonstrate that interfaces between the ECS Subsystem Servers and their respective M&O Administrative terminal(s) will support Maintenance of ECS Data bases. Demonstrate that maintenance of ECS DBs do not require a "change" of display screens after modification of database structures provided by ECS DB servers. Demonstrate capabilities to interrupt maintenance session and restart the session without loss of information. Verify through Inspection that LaRC LSM database maintenance capabilities reflect cross site standards for maintenance of ECS Databases. The procedure assures that the procedures are available, current, and complete.	
Requirements	Acceptance Criteria	
IMS-0170#A	<p>This requirement is verified through demonstration.</p> <p>The IMS user interface must be designed so that restructuring of IMS data bases shall not result in the need for changes to the IMS interface.</p> <p>Demonstrate ESDT DB restructuring activities using interfaces between SDSVR CSCI and the SDSVR ADMIN/OPS terminal. Demonstrate Advertising DB restructuring activities using interfaces between ADSVR CSCI and the ADSVR ADMIN/OPS terminal. Demonstrate Dictionary DB restructuring activities using interfaces between DDICT CSCI and the DDICT ADMIN/OPS terminal.</p> <p>DB schema updates do not require Admin staff to change or otherwise re-select "view" screens to confirm schemata update results.</p>	
IMS-0210#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall allow data access privileges to be configurable by user and data type for:</p> <ul style="list-style-type: none"> a. Read b. Write c. Update d. Delete e. Any combination of the above <p>The Tester must be able to log on to a user account and reconfigure account privileges.</p>	
IMS-0220#A	<p>The requirement is verified through demonstration.</p> <p>The IMS shall store, maintain and provide data management services for ECS directory, inventory, and guide (documentation/reference material) and other IMS data bases.</p> <p>The Tester must be able to store, maintain and access data management services for ECS directory, inventory, and guide databases.</p>	
IMS-0230#A	<p>The requirement is verified through demonstration.</p> <p>The IMS shall restrict update of ECS directory, inventory, and guide (documentation/reference material) and other IMS data bases to authorized users based on the users access privileges.</p> <p>Only authorized users with valid passwords are able to logon to ECS and update ECS directory, inventory, and guide (documentation/reference material) and other IMS data bases.</p>	

IMS-0240#A	<p>The requirement is verified through demonstration.</p> <p>The IMS shall provide, at a minimum, database administration utilities for:</p> <ul style="list-style-type: none"> a. modification of ECS database schema, b. performance monitoring, c. performance tuning, d. administration of user access control, e. perform on-line incremental backup, f. perform on-line recovery, and g. export/import of data. <p>Demonstrate that once a DB administration utility session is established, it's capabilities and services are segmented and exercised in a mutually exclusive fashion.</p> <p>Demonstrate that any combination of (a) through (g) can be exercised concurrently on a single Operations workstation or across multiple workstations.</p>
IMS-0250#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide required maintenance of the IMS data bases, to include at a minimum:</p> <ul style="list-style-type: none"> a. Capability to restructure the data base b. Capability to interrupt a maintenance session and restart the session without loss of information. <p>The Tester must be able to restructure the database and restart without loss of information following an interruption of a maintenance session.</p>
IMS-0260#A	<p>This requirement is verified through demonstration.</p> <p>The IMS must provide interactive and batch information management capabilities for authorized users to add, update, delete and retrieve information from the ECS data databases.</p> <p>Demonstrate capabilities for authorized personnel to access and use DB administration services in both batch and interactive modes of operation.</p> <p>Demonstrate capability to submit batch tasks which accomplish DB updates, DB deletions and DB retrievals to/from ECS data resources.</p> <p>Demonstrate capability to interactively control tasks to accomplish DB updates, DB deletions and DB retrievals to/from ECS data resources.</p>
IMS-0290#A	<p>This requirement is verified through demonstration.</p> <p>IMS internal data base management queries shall be expressed in a standard query language (SQL).</p> <p>Demonstrate database management queries written in SQL.</p> <p>Change method from analysis to demonstration in CCR.</p>

IMS-0350#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide capability for authorized personnel to add, delete, or modify ECS metadata entries, individually or in groups.</p> <p>Demonstrate capabilities for authorized personnel to access and use DB administration services. Personnel demonstrate capability to add, delete or modify ECS metadata entries (individual or group) based on ownership.</p> <p>Demonstrate capabilities for authorized personnel to access and use DB administration services. Personnel demonstrate capability to add, delete or modify ECS metadata entries (individual or group) based data types. Demonstrate capabilities for authorized personnel to access and use DB administration services. Personnel demonstrate capability to add, delete or modify ECS metadata entries (individual or group) based on privileges.</p> <p>Verification in RTM Inspection. Method changed to demonstration. Requires update pending CCR.</p>			
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version
Registered Users (principal)			Principal users by organization (ECS/Non-ECS)	
Access Control List (LaRC)			Access to ECS resources with account links	
Authentication's			Authentication's and Authorization of ECS service operations by group and user.	
User Profiles			Contact information, affiliations, sponsor, account number, shipping and billing , privileges, expiration date, e-mail etc..	
Advertising Service DB			Advertising Service DB Collection and Schema	
Science Data Server ESDT DB			Science Data Server ESDT DB Collection and Schema	
Data Dictionary Server Dictionary DB			Data Dictionary Server Dictionary DB Collection and Schema	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass/Fail/Comments
	Science Data Server (SDSVR) CSCI	
100	Computer Operator: Initialize a SDSVR CSCI, establishes an Admin. session, selects the ESDT DB schema update function, and configures the SDSVR schema update function to monitor the status of the session.	
105	Expected Results: The selected SDSVR CSCI is available, an Admin/Ops session is established, the ESDT DB schemata update function provides a default screen for viewing ESDT DB schema information, and there are no errors resulting from the session establishment.	
110	Computer Operator: Select an ESDT DB collection and a schema within that collection to update.	
115	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no status error from selection actions is presented and the Schema is returned and displayed for update.	
120	Computer Operator: Monitor the Update status indicators and performs the data entry to update the schema.	
125	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from the update actions are presented and the Schema remains displayed while Computer Operator reviews his/her update inputs.	
130	Computer Operator: Monitors the Update service status indicators, request status of the schema update be provided by the service, and submit the schemata update to the SDSVR.	
135	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from the submit actions are presented in status messages.	
140	Computer Operator: Monitors the Update service status indicators and request status of the schema update submit be provided by the ESDT DB Schema Update service.	
145	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schema, status message(s) indicate that selected ESDT DB collection schema has been accepted and updated, no errors from the accept and update actions are presented in status messages, "new" ESDT DB collection schema is presented without having to change the update service "view" screen(s). Schema contains all updates entered by the tester	
150	Computer Operator: Monitors service status indicators for schema update activities and request SDSRV Admin. service to terminate both the ESDT DB Schemata update and Admin. service sessions.	
	Advertising Data Server (ADSVR) CSCI	
160	Computer Operator: Initialize a ADSVR CSCI, establish an Admin. session, select the Advertising DB schema update function, and configure the ADSVR schema update function to monitor the status of the session.	

170	Expected results: The selected ADSVR CSCI is available, an Admin./Ops session is established, the Advertising DB schemata update function provides a default screen for viewing Advertising DB schema information, and there are no errors resulting from the session establishment.	
180	Computer Operator: Select an Advertising DB collection and a schema within that collection to update.	
190	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no status error from selection actions is presented and the Schema is returned and displayed for update.	
200	Computer Operator: Monitor the Update status indicators and performs the data entry to update the schema.	
210	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from the Schema update actions are presented and the Schema remains displayed while Computer Operator reviews his/her update inputs.	
220	Computer Operator: Monitor the Update service status indicators, request status of the schema update be provided by the service, and submit the schemata update to the ADSVR.	
230	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from the submit actions are presented in status messages.	
240	Computer Operator: Monitor service status indicators and request status of the schema update submit be provided by the Advertising DB Schema Update service.	
250	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schema, status message(s) indicate that selected Advertising DB collection schema has been accepted and updated, no errors from the accept and update actions are presented in status messages, "new" Advertising DB collection schema is presented without having to change the update service "view" screen(s). Schema contains all update entered by the tester	
260	Computer Operator: Monitor service status indicators for schema update activities and request ADSRV Admin. service to terminate both the Advertising DB Schema update and Admin. service sessions.	
270	Expected Results: Sessions are terminated without error messages, no status messages about updated schema are presented, and no error status messages about session termination are presented.	
	Data Dictionary (DDICT) CSCI	
300	Computer Operator: Initialize a DDICT CSCI , establishes an Admin. session, selects the dictionary DB schema update function, and configures the DDICT schema update function to monitor the status of the session.	
305	Expected results: The selected DDICT CSCI is available, an Admin./Ops session is established, the dictionary DB schemata update function provides a default screen for viewing DB schema information, and there are no errors resulting from the session establishment.	

310	Computer Operator: Select a dictionary DB collection and a schema within that collection to update.	
315	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no status error from selection actions is presented and the Schema is returned and displayed for update.	
320	Computer Operator: Monitor the Schema Update status indicators and perform the data entry to update the schema.	
325	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from update actions are presented, and the Schema remains displayed while Computer Operator reviews his/her update inputs.	
330	Computer Operator: Monitors service status indicators, request status of the schema update activities be provided by the service, and submit the schemata update to the dictionary DB.	
335	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schemata, no errors from the submit actions are presented in status messages.	
340	Computer Operator: Monitor the schema Update service status indicators and request status of the schema update submit be provided by the DDICT DB Update service.	
345	Expected Results: Session remains established, Computer Operator does not select a new display to "View" the schema, status message(s) indicate that selected Dictionary DB collection schema has been accepted and updated, no errors from the accept and update actions are presented in status messages, "new" DB collection schema is presented without having to change the update service "view" screen(s). Schema contains all updates entered by the tester	
350	Computer Operator: Monitor service status indicators for schema update activities and request DDICT Admin. service to terminate both the Dictionary DB Schema update and Admin. service sessions.	
355	Expected Results: Sessions are terminated without error messages, no status messages about updated schema are presented, and no error status messages about session termination are presented.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.6 Site Data/Metadata/Information Management Sequence

The Site Data/Metadata/Information Management Sequence verifies the ECS capability to perform file management of ECS data, metadata, and application information, and to maintain file directory of the files under its control..

The LaRC DAAC's ability to produce specified backups is also included in this sequence. The ECS capability for storage of ECS data/metadata information in local and off-site locations is verified.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DMS, DSS, & ISS. Refer to Appendix D for additional detail.

External Interfaces: There are no external interfaces needed for this sequence.

Operator Position(s): The operator position from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence is listed:

DAAC Computer Operator

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that was used to develop tests in this sequence of tests are listed:

Computer System Administration Backup & Restore/Recovery Scenario (Section 3.1.2)

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080170.020\$L	A080140.010\$L A080150.010\$L A080150.020\$L	Run A080170.020\$L prior to A080140.010\$L, A080140.010\$L, and A080150.020\$L any test in this sequence.

8.1.6.1 File Management

TEST Procedure No.: A080170.010\$L	Date Executed:	Test Conductor:		
Title: File Management				
Objective: The purpose of the test is to confirm the site's capability to perform File Directory Management functions. The AT team confirms by demonstration, that mechanisms are included in the system for File Directory Management functions.				
Requirements		Acceptance Criteria		
DADS1530#A		This requirement is verified through demonstration. Each DADS shall maintain a File Directory of all data files which have been archived and are under its control. The Tester verifies that a File Directory of archived data files exists.		
DADS1550#A		This requirement is verified through demonstration. Operations/systems personnel shall be able to access, list, or modify the contents of the file directory in a special privileged mode. The Tester verifies that the system provides a mechanism to create the File Directory. The Tester verifies that system provides a mechanism to append, display, update, and print records to the File Directory.		
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version
TEMP_001		Temp1		
TEMP_002		Temp2		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	System Administrator: Login to the Science Data Server.	
20	Expected Results: The Science Data Server is available.	
30	System Administrator: Display the directory containing the Archive Log Files	
40	Expected Results: The Archive Log file directory list is displayed on the screen.	
50	System Administrator: Display the archive directory.	
60	Expected Results: The Archive Directory list is displayed on the screen.	
70	System Administrator: Open a file, "Temp1," in the Archive Directory.	
80	Expected Results: The system displays the "Temp1" file.	
90	System Administrator: Edits "Temp1" and saves it.	
100	Expected Results: The edited version of "Temp1" is stored.	
110	System Administrator: Creates a file, "Temp2", and saves it in the Archive Directory.	
120	Expected Results: The new file, "Temp2," is stored in the Archive Directory.	
130	System Administrator: Opens "Temp1" and views the edited version of the file.	
140	Expected Results: The edited version is displayed on the screen.	
160	System Administrator: Opens "Temp2" and views the edited version of the file.	
170	Expected Results: The new file, "Temp2," is displayed on the screen.	
	System Administrator: Appends data to "Temp1."	
	Expected Result: Data is appended to "Temp1."	
	System Administrator: Opens "Temp1."	
	Expected Result: "Temp1" is displayed on the screen containing the original information and the appended data.	
	System Administrator: Prints "Temp1" and "Temp2."	
	Expected Results: A hardcopy of "Temp1" and "Temp2" are produced by the printer.	
	System Administrator: Examines the hardcopy of "Temp1" and "Temp2" comparing it to the information displayed on the screen.	
	Expected Results: The comparison of "Temp1" and "Temp2" verifies the contents of the files.	
Data Reduction and Analysis Steps: a. The following are secured for analysis at the close of the procedure: <ol style="list-style-type: none"> 1. Archive logs. 2. Hardcopies of the files. 		
Signature:		Date :

8.1.6.2 ECS Storage/Archive/Backup Capability

TEST Procedure No.: A080170.020\$L	Date Executed:	Test Conductor:
Title: ECS Storage/Archive/Backup Capability		
Objective: The purpose of the test is to confirm the site's capability to store, archive, and backup data.		
Requirements	Acceptance Criteria	
DADS0425#A	<p>This requirement is verified through inspection.</p> <p>Archive and backup media at each DADS shall have a rated shelf life of at least 10 years as determined by the National Archives and Records Administration (NARA), National Institute for Standards and Technology (NIST), NASA, or a professional or industry organization such as ANSI, the Society of Motion Picture and Television Engineers (SMPTE) or the National Association of Broadcasters (NAB).</p> <p>The tester reviews the backup media's specs and verifies that the manufactured shelf life of the backup media is of at least 10 years when stored in a controlled environment.</p> <p>Change verification method from test to inspection.</p>	
DADS0430#A	<p>This requirement is verified through test.</p> <p>Each DADS shall provide its operations personnel the capability to manually alter the routing of data sets to physical storage locations.</p> <p>The Tester verifies that the system provides the capability to display, change, and print the allocation of storage devices to Data Servers.</p>	
DADS0435#A	<p>This requirement is verified through test.</p> <p>At each DADS operations personnel shall be able to add new physical volumes and eject physical volumes from the archive for off-line or off-site permanent storage.</p> <p>The Tester verifies the ability to mount, insert into, remove from, and dismount archive media storage devices which support removable media.</p>	
DADS1370#A	<p>This requirement is verified through test.</p> <p>Each DADS shall provide a mechanism for statistically monitoring both the raw and corrected bit error rate (BER) of storage media in the archive.</p> <p>The Tester verifies that the system calculates a checksum for each file associated with each data granule stored in the archive.</p> <p>Need further information on implementation. On ESDIS List.</p>	
DADS1375#A	<p>This requirement is verified through test.</p> <p>Each DADS shall provide automatic management and copying/refresh of archive media.</p> <p>Need further information on implementation. On ESDIS List.</p>	
DADS1710#A	<p>This requirement is verified through demonstration.</p> <p>The DADS shall comply with evolving guidelines and standards in such areas as file storage, storage management, and backup where appropriate.</p> <p>The System must provide the capability to insert, initialize, load, unload and remove archive media into storage devices which support removable media. The System must provide the capability to perform physical inventories of archive media resident in archive storage devices.</p>	

DADS1791#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall have the capability to mount archival media via automated means.</p> <p>The Tester mounts archival media using the storage device allocation function of the system.</p>
DADS2270#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall provide, on a scheduled basis, an off-site backup copy of all EOS data which would be impossible or difficult to recover in case of loss.</p> <p>The Tester verifies the existence of an off-site backup copy of data.</p>
DADS2300#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall provide a capability for local and offsite backup/restore of system files.</p> <p>This test does not verify the restore capabilities of this requirement. The Tester verifies the ability to create local and offsite backups.</p>
DADS2302#A	<p>This requirement is verified through demonstration.</p> <p>Offsite and local backup media shall be based on published, open, and non-proprietary formats which fully describe the physical organization and structure of files.</p> <p>The Tester verifies that the backup archive media conforms to openly published and non-proprietary formats for recording data.</p>
DADS2910#A	<p>This requirement is verified through demonstration.</p> <p>Archival storage at each DADS shall be field-expandable.</p> <p>Field-expandable is defined as increasing the capacity or size of archive storage without removing archive storage device from site.</p> <p>Need further information on implementation. On ESDIS List.</p>
DADS3000#A	<p>This requirement is verified through demonstration.</p> <p>To support archival data integrity, the bit error rate after correction shall be less than 1 in 10 to the 12th.</p> <p>Need further information on implementation. On ESDIS List.</p>
DADS3010#A	<p>This requirement is verified through inspection.</p> <p>Archival and backup media at each DADS shall have a manufacture-rated shelf life of at least 10 years when stored in a controlled environment.</p> <p>The Tester reviews the backup media's specs and verifies that the manufactured shelf life of the backup media is of at least 10 years when stored in a controlled environment.</p>
DADS3040#A	<p>This requirement is verified through test.</p> <p>At each DADS backup media shall be removable from the DADS site (e.g., for safe off-site storage).</p> <p>The Tester verifies the existence of an off-site backup copy of data.</p>
DADS3055#A	<p>This requirement is verified through test.</p> <p>At each DADS all backup media shall be capable of being mounted automatically where appropriate, with the provision for manual failover.</p> <p>The Tester verifies that the system provides the capability mount on-line backup media via automated means.</p>
EOSD3200#A	<p>This requirement is verified through test.</p> <p>A minimum of one backup which is maintained in a separate physical location shall be maintained for ECS software and key data items.</p> <p>The Tester verifies the existence of an off-site backup copy of data.</p>

EOSD3220#A	<p>This requirement is verified through inspection.</p> <p>All media shall be handled and stored in protected areas with environmental and accounting procedures applied.</p> <p>The Tester verifies the existence of an off-site backup copy of data and verify the environmental and accounting procedures are applied in accordance with the <u>Property Management Plan for the ECS Project (602/OP1)</u>.</p>			
Test Inputs: <u>Mission Operation Procedures for the ECS Project (611/OP3)</u> <u>Property Management Plan for the ECS Project (602/OP1)</u>				
Data Set Name	Data Set ID	File Name	Description	Version
NMC_001			NMC data	
VIRS_001			VIRS 1A, 1B, algorithms	
VIRS_002			VIRS Browse data	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Computer Operator: Insert the backup media into the storage device. Initialize storage device.	
20	Expected Results: Storage device is initialized.	
30	Computer Operator: Obtain backup media specs. Using the backup media's specs, verify that the manufactured shelf life of the backup media is of at least 10 years when stored in a controlled environment.	
40	Expected Results: The backup media's specs state that the manufactured shelf life of the media is at least 10 years.	
50	Computer Operator: Load and view contents of backup media.	
60	Expected Results: Backup media blank.	
70	Computer Operator: Accesses storage device allocation screen.	
80	Expected Results: Storage device allocation screen appears.	
90	Computer Operator: Allocates storage devices for backup.	
100	Expected Results: Storage device allocation screen depicts desired allocations.	
110	Computer Operator: Execute Autosys backup software. Initiate complete system backup.	
120	Expected Results: Backup software executes system backup. Backup completes.	
130	Computer Operator: Lists files contained on the backup media. Verifies content of the listing.	
140	Expected Results: Displays files contained on the backup media.	
150	Computer Operator: Dumps contents of the backup media. Verifies the format of the data.	
160	Expected Results: The backup media must be based on published, open, and non-proprietary formats which fully describe the physical organization and structure of files.	
170	Computer Operator: Invokes the word processor to review the QA report on the backup job.	
180	Expected Results: The QA report displays on the screen. The QA report must contain a file listing with the last update date and time and a tapescan with a dump of the first and last file.	
190	Computer Operator: Opens the log file. Updates the backup log with an entry indicating the status of the backup. Saves updated backup log.	
200	Expected Results: The log file displays on the terminal. The updated log file is stored.	
210	Computer Operator: Insert the backup copy media into another storage device. Initialize this storage device.	
220	Expected Results: Storage device is initialized.	

230	Computer Operator: Makes a copy of the backup.	
240	Expected Results: The software performs the copy. Copy completes.	
250	Computer Operator: Unload and remove backup media from the storage devices.	
260	Computer Operator: Marks the copy for off-site storage. Store backup in protected area. Store backup copy in an off-site protected area.	
270	Expected Results: Backup copy is marked and stored in an off-site protected area. Backup is stored locally in a protected area.	
280	Computer Operator: Generates a QA report on the copied media. Reviews the QA report on the copied media.	
290	Expected Results: The Copied media QA report displays on the screen. The QA report must contain a file listing with the last update date and time and a tapescan with a dump of the first and last file.	
300	Computer Operator: Updates the backup log with an entry indicating the status of the copy of the backup. Saves updated backup log.	
310	Expected Operator: The log file displays on the terminal. The updated log file is stored.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.1.7 Facilities Interfaces Sequence

This sequence verifies the basic connectivity and fundamental protocols for LaRC ECS DAAC external and internal interfaces in support of Release A operations. Confirmation of ECS internal (SMC, EOC, GSFC, and EDC) and external interfaces (TSDIS and V0 DAACs) is performed through inspection of before and after data transmission products compared to requirements. Internal ECS interfaces are evaluated similarly. The operational version of external systems are used if they are mature and available at the time of acceptance testing on this sequence. Otherwise, simulators are used.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & ISS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SDPF

SMC

EOC

GSFC ECS DAAC

EDC ECS DAAC

GSFC V0 DAAC

LaRC V0 DAAC

EDC V0 DAAC

MSFC V0 DAAC

NOAA ADC

Operator Position(s): The operator position from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence is listed:

DAAC Computer Operator

Operational Scenario(s): There are no operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A (605/OP1), used during this sequence of tests.

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080180.090\$L	A080180.090\$G A080180.090\$E A080180.090\$F A080180.090\$S	Concurrent

8.1.7.1 SMC External Interfaces

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.1.7.2 EOC External Interfaces

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.1.7.3 GSFC DAAC External Interfaces

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.1.7.4 LaRC DAAC External Interfaces

TEST Procedure No.: A080180.060\$L	Date Executed:	Test Conductor:
Title: LaRC DAAC External Interfaces		
Objective: This test case verifies LaRC ECS DAAC connectivity with ECS external systems using the File Transfer Protocol.		
Requirements	Acceptance Criteria	
ESN-0070#A	<p>This requirement is verified through test.</p> <p>The ESN shall support the intrasite elements data flow requirements identified in this specification.</p> <p>The ISS must provide for connectivity with external interfaces in order to transfer data to the LaRC ECS DAAC.</p>	
ESN-0280#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide file transfer and management service and as a minimum must include the capability to transfer the following data types:</p> <ul style="list-style-type: none"> a. Unstructured Text b. Binary Unstructured c. Binary Sequential d. Sequential Text <p>The CSS File Access Service must be able to transfer text and binary files.</p>	
ESN-0290#A	<p>This requirement is verified through test.</p> <p>The file transfer and management service shall be available in interactive and non-interactive services.</p> <p>The CSS File Access Service must provide functionality for interactive and non-interactive transfer of files (send and receive) between two host systems.</p>	
ESN-0300#A	<p>This requirement is verified through test.</p> <p>The file transfer and management non-interactive services shall be able to be scheduled.</p> <p>The CSS File Access Service must provide an option for scheduling file transfers in a batch mode.</p>	
IMS-0860#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide an interface to ADC and ODC data systems and archives that produce, process, and/or maintain Earth science data sets and that have agreed to make the information and services available to ECS.</p> <p>The system must be able to transfer data between LaRC and ADC.</p> <p>There are no ODCs in Release A.</p>	
IMS-1600#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide access to the following communication services at a minimum:</p> <ul style="list-style-type: none"> a. File transfer b. Multi media mail c. Remote log-on d. Electronic Bulletin Board e. Access to other networks <p>The system must provided the capability to exchange data via file transfer. This test does NOT verify parts b, c, d, or e of the requirement.</p>	

NOAA0600#A	<p>This requirement is verified through demonstration.</p> <p>The SAAs shall have the capability to send and the ECS must have the capability to receive Network Management information.</p> <p>The MSS must interface with the Affiliated Data Centers (ADC) to exchange data.</p> <p>Add verification method to RTM in CCR.</p>			
NOAA0610#A	<p>This requirement is verified through demonstration.</p> <p>The ECS shall have the capability to send and the SAAs must have the capability to receive Network Management information.</p> <p>The MSS must interface with the Affiliated Data Centers (ADC) to exchange data.</p> <p>Add verification method to RTM in CCR.</p>			
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version
CERES_001			CERES data	
DUMV0_001			Dummy text files from the V0 DAACs	
DUMNOAA_001			Dummy info file from the NOAA ADC	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	Interface to SDPF	
	Assumption Communication session between the LaRC DAAC and the SDPF is established.	
10	Tester: Receives a DAN from SDPF.	
20	Expected Results: ECS automatically checks the DAN and sends a DAA.	
30	Tester: Invokes the kftp to manually ingest data files.	
40	Expected: All data files in the DAN are transferred.	
50	Tester: Sends DDN to the SDPF.	
60	Expected Results: System receives DDA from SDPF and ends communication session with the SDPF	
	Interface to V0 DAACs	
70	Computer Operator: Access FTP Software Window.	
80	Expected Results: FTP software windows becomes active.	
90	Computer Operator: Specify GSFC V0 DAAC text file to be transferred. Specify the GSFC V0 DAAC address as the source address and the LaRC address as the destination address for the transfer.	
100	Computer Operator: Execute transfer.	
110	Computer Operator: Verify transmission using system logs and data storage facilities.	
120	Expected Results: System logs contain evidence of the transfer.	
130	Computer Operator: Access the FTP Software Window.	
140	Expected Results: FTP software window becomes active.	
150	Computer Operator: Specify LaRC V0 DAAC text file to be transferred. Specify the LaRC V0 DAAC address as the source address and the LaRC address as the destination address for the transfer.	
160	Computer Operator: Execute transfer.	
170	Computer Operator: Verify transmission using system logs and data storage facilities.	
180	Expected Results: System logs contain evidence of the transfer.	
190	Computer Operator: Access the FTP Software Window.	
200	Expected Results: FTP software window becomes active.	
210	Computer Operator: Specify EDC V0 DAAC text file to be transferred. Specify the EDC V0 DAAC address as the source address and the LaRC address as the destination address for the transfer.	
220	Computer Operator: Execute transfer.	

230	Computer Operator: Verify transmission using system logs and data storage facilities.	
240	Expected Results: System logs contain evidence of the transfer.	
250	Computer Operator: Access the FTP Software Window.	
260	Expected Results: FTP software window becomes active.	
	Interface to the NOAA ADC	
270	Computer Operator: Specify NOAA ADC text file to be transferred. Specify the NOAA ADC address as the source address and the LaRC address as the destination address for the transfer.	
280	Computer Operator: Execute transfer.	
290	Computer Operator: Verify transmission using system logs and data storage facilities.	
300	Expected Results: System logs contain evidence of the transfer.	
310	Computer Operator: Access the FTP Software Window.	
320	Expected Results: FTP software window becomes active.	
330	Computer Operator: Specify LaRC text file to be transferred. Specify the LaRC address as the source address and the NOAA ADC address as the destination address for the transfer.	
340	Computer Operator: Execute transfer.	
350	Computer Operator: Verify transmission using system logs and data storage facilities.	
360	Expected Results: System logs contain evidence of the transfer.	
Data Reduction and Analysis Steps:		
a. The following are secured for analysis at the close of the procedure: System FTP logs.		
Signature:		Date:

8.1.7.5 EDC DAAC External Interfaces

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.1.7.6 ECS Internal Interfaces

TEST Procedure No.: A080180.090\$L	Date Executed:	Test Conductor:
Title: ECS Internal Interfaces		
Objective: This test case verifies the capability for the LaRC DAAC to communicate with the GSFC, EDC, SMC and EOC.		
Requirements	Acceptance Criteria	
ESN-0010#A	<p>This requirement is verified through test.</p> <p>ESN shall provide the following standard services:</p> <ul style="list-style-type: none"> a. Data Transfer and Management Services b. Electronic Messaging Service c. Remote Terminal Service d. Process to Process Communication Service e. Directory and User Access Control Service f. Network Management Service g. Network Security and Access Control Service h. Internetwork Interface Services i. Bulletin Board Service <p>The CSS Electronic Mail Service must allow the users to create, modify and delete messages. The CSS Electronic Mail Service must provide the ability to send and receive messages. The CSS Electronic Mail Service must provide the ability to attach files to messages. This test does NOT verify parts c, e, f and g of the requirement.</p>	
ESN-0340#A	<p>This requirement is verified through test.</p> <p>The ESN shall interoperate and exchange messages and data with external SMTP and X.400 mail systems.</p> <p>The Tester must verify the ability to provide translation between SMTP and X.400 protocols by creating a message in one protocol and sending/receiving it in another.</p>	
ESN-0345#A	<p>This requirement is verified through test.</p> <p>The ESN shall be capable of transparently transmitting Multi-purpose Internet Mail Extensions (MIME) messages.</p> <p>The CSS Electronic Mail Service must be capable of sending and receiving the Multi-purpose Internet Mail Extensions (MIME) messages.</p>	
ESN-0350#A	<p>This requirement is verified through test.</p> <p>The Electronic Messaging Service shall be capable of exchanging binary data.</p> <p>The CSS Electronic Mail Service must allow attaching either text or binary files to a message.</p>	
ESN-0450#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide process-to-process communication service.</p> <p>The CSS Message service must provide an API for senders to send messages to receivers asynchronously without waiting for the receivers to receive it.</p>	
ESN-1170#A	<p>This requirement is verified through test.</p> <p>The ESN must provide necessary translation within supported file transfer and e-mail services.</p> <p>The CSS Electronic Mail Service must provide translation between SMTP and X.400 protocol.</p>	

ESN-1181#A	<p>This requirement is verified through demonstration.</p> <p>The ESN shall provide an ECS Bulletin Board capability.</p> <p>The CSS Bulletin Board Service must allow the users to post messages to and delete messages from bulletin board(s). The CSS Bulletin Board Service must provide the capability for copying files. The CSS Bulletin Board Service must support multiple bulletin boards. The CSS Bulletin Board Service must allow multiple messages for each bulletin board.</p>
ESN-1350#A	<p>This requirement is verified through inspection.</p> <p>The ESN LANs shall provide physical devices and the corresponding medium access control (MAC) protocol compatible with ISO and ANSI standards.</p> <p>The Tester reviews the physical devices' specs and verifies that the medium access control (MAC) protocol is compatible with ISO and ANSI standards.</p>
IMS-1600#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide access to the following communication services at a minimum:</p> <ul style="list-style-type: none"> a. File transfer b. Multi media mail c. Remote log-on d. Electronic Bulletin Board e. Access to other networks <p>The Tester verifies the capabilities of the CSS Mail Service and the CSS Bulletin Board Service. This test does not verify parts a, c and e of the requirement.</p>
NSI-0010#A	<p>This requirement is verified through test.</p> <p>NSI, responsible for EOSDIS "Mission Success" network services, shall provide network connectivity to the following ECS facilities:</p> <ul style="list-style-type: none"> a ECS at the GSFC DAAC, Goddard Space Flight Center (GSFC), Greenbelt, Maryland c System Monitoring and Coordination facility (SMC), Goddard Space Flight Center (GSFC), Greenbelt, Maryland f ECS at the LaRC DAAC, Langley Research Center (LaRC), Hampton, Virginia <p>The LaRC DAAC must be able to transfer data with the SMC and GSFC DAAC.</p>
SMC-2120#A	<p>This requirement is verified through demonstration.</p> <p>The SMC shall make available for automated distribution to authorized users all unlicensed toolkit software, toolkit software upgrades, and toolkit documentation.</p> <p>The LaRC DAAC LSM must be able to access authorized unlicensed toolkit software, toolkit software upgrades, and toolkit documentation via the bulletin board.</p>
SMC-2610#A	<p>This requirement is verified through demonstration.</p> <p>The SMC shall provide and maintain a bulletin board service with information on ECS status, events, and news.</p> <p>The LaRC DAAC LSM must be able to obtain information on ECS status, events, and news via the bulletin board.</p>

EOSD0740#A	This requirement is verified by test. Each ECS element shall provide a set of real or simulated functional capabilities for use in the following types of test: a. System (components of an ECS element) b. Element (fully integrated element) c. ECS System (Integration of ECS elements) This requirement is verified in steps 70 and 260			
	Test Inputs: Valid account names and passwords for accounts at each DAAC, SMC and EOC.			
Data Set Name	Data Set ID	File Name	Description	Version
TOOLKIT_001			authorized unlicensed toolkit software	
TOOLKIT_002			toolkit software upgrades	
TOOLKIT_003			toolkit documentation	
EMAIL_001			Sample E-mail message	
EMAIL_002			Sample E-mail attachment	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Computer Operator: Access Communications Server and invoke E-mail client.	
20	Computer Operator: Create a new message. Specify E-mail address at GSFC DAAC. Specify subject and body of message to be sent to GSFC DAAC. Attach file to the message. Send the message to GSFC DAAC.	
30	Computer Operator: Select message sent to LaRC. Change E-mail address at EDC DAAC. Edit subject and body of message to be sent to EDC DAAC. Attach file to the message. Send the message to EDC DAAC.	
40	Computer Operator: Create a new message. Specify E-mail address at SMC. Specify subject and body of message to be sent to SMC. Attach text and binary files to the message. Send the message to SMC.	
50	Computer Operator: Create a new message. Specify E-mail address at EOC. Specify subject and body of message to be sent to EOC. Attach file to the message. Send the message to EOC.	
60	Computer Operator: View LaRC E-mail logs to verify transmission of each E-mail message.	
70	Expected Results: System logs reflect transmission of each E-mail message.	
80	LaRC Computer Operator: Views E-mail. The message is inspected for evidence of transmission errors.	
90	Expected Results: The message transmission does not contain any evidence of transmission errors, such as garbled text.	
100	GSFCC Computer Operator: Creates a reply message specifying E-mail address at LaRC DAAC as well as the subject and body of message. Send the message to LaRC DAAC.	
110	Computer Operator: Opens reply message verifying receipt of reply message. Print and delete message.	
120	Expected Results: The hardcopy is available from the printer. The message no longer resides in the In box.	
130	EDC Computer Operator: Views E-mail. The message is inspected for evidence of transmission errors.	
140	Expected Results: The message transmission does not contain any evidence of transmission errors, such as garbled text.	
150	EDC Computer Operator: Creates a reply message specifying E-mail address at GSFC DAAC as well as the subject and body of message. Send the message to GSFC DAAC.	
160	Computer Operator: Opens reply message verifying receipt of reply message. Print and delete message.	
170	Expected Results: The hardcopy is available from the printer. The message no longer resides in the In box.	
180	SMC Computer Operator: Views E-mail. The message is inspected for evidence of transmission errors.	

190	Expected Results: The message transmission does not contain any evidence of transmission errors, such as garbled text.	
200	SMC Computer Operator: Creates a reply message specifying E-mail address at LaRC DAAC as well as the subject and body of message. Send the message to LaRC DAAC.	
210	Computer Operator: Opens reply message verifying receipt of reply message. Print and delete message.	
220	Expected Results: The hardcopy is available from the printer. The message no longer resides in the In box.	
230	EOC Computer Operator: Views E-mail. The message is inspected for evidence of transmission errors.	
240	Expected Results: The message transmission does not contain any evidence of transmission errors, such as garbled text.	
250	EOC Computer Operator: Creates a reply message specifying E-mail address at LaRC DAAC as well as the subject and body of message. Send the message to LaRC DAAC.	
260	Computer Operator: Opens reply message verifying receipt of reply message. Print and delete message.	
270	Expected Results: The hardcopy is available from the printer. The message no longer resides in the In box.	
280	Computer Operator: Creates multiple messages and posts them to a bulletin board.	
290	Computer Operator: Accesses the bulletin board and verifies that the messages are present.	
300	Expected Result: The messages are accessible through the bulletin board.	
310	Computer Operator: Creates multiple messages and posts them to multiple bulletin boards.	
320	Computer Operator: Accesses the bulletin boards and verifies that the messages are present.	
330	Expected Result: The messages are accessible through the bulletin boards.	
340	Computer Operator: Copies a file from the bulletin board.	
350	Expected Result: Lists the contents of the directory to verify the receipt of the downloaded file.	
360	Computer Operator: Deletes a message from the bulletin board.	
370	Expected Result: The bulletin board refreshes without the deleted message reflecting the deletion.	
380	Computer Operator: Accesses a different bulletin board and deletes multiple messages.	
390	Expected Result: The bulletin board refreshes without the deleted message reflecting the deletion.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.2 Scheduling Scenario

The Scheduling Scenario verifies the ability to generate a series of schedules involving this site and support by other sites. It follows the process of scheduling the activities at each site, coordinating them with other sites through the SMC and resolving scheduling conflicts when they arise. The scenario then continues with the development of a coordinated master schedule by SMC operators. It carries the SMC operators through the schedule request, development, confirmation and adjudication process; returning in full-circle to the scheduler who initiated the schedule request.

The purpose of this scenario is to evaluate the ECS site-level scheduling capability. ECS capability for acquiring, storing and maintaining schedules, negotiating and maintaining ground event functional allocations and priorities are assessed. SMC procedures for acquiring and maintaining ECS schedules, and for generating associated site-to-site and site-to-site integration, test, simulation, operations and maintenance directives are also evaluated.

This scenario also evaluates procedures for adjudicating cross-site and cross-facility schedule conflicts in the best interests of the systems users and in a manner that promotes the most efficient use of all ECS site and the total ECS system.

Procedures for receiving and analyzing product generation schedules from the DAACs and other ECS sites are evaluated as well as SMC's methodology for recommending, reviewing, approving and disseminating information related to schedule implementations or adjustments.

Each site's LSM scheduling activity is evaluated for its ability to communicate and receive scheduling information from the SMC as well as its effectiveness in monitoring, coordinating and implementing SMC integrated schedules within assigned sites.

8.2.1 Schedule Generation Sequence

The Schedule Generation Sequence evaluates the schedule generation process as implemented at LaRC. This confirms the ECS systems scheduler's capability for generating and analyzing inputs, integrating, and distributing approved site-level schedules, and for developing and communicating appropriate site scheduling guidelines for instrument and ground event scheduling. The receipt, analysis and implementation of scheduling directives by the LaRC LSM and subsequent coordination and implementation by LaRC scheduling personnel into site planning are evaluated.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, ISS & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interface (i.e., other ECS sites and data sources) needed for this sequence (both real and simulated) is listed:

SMC

Operator Position(s): The operator position from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Production Planner

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that were used to develop tests in this sequence of tests are listed:

Resource Planning Scenario (Section 3.7.1)

Routine Production Planning Scenario (Section 3.12.1)

Test Dependencies: The following table identifies the test procedure(s) for this sequence of tests that should be run prior to or concurrently with this test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080210.010\$L	A080210.010\$S	Concurrent
A080210.020\$L	A080210.020\$S	Concurrent

8.2.1.1 DAAC Schedule Generation

TEST Procedure No.: A080210.010\$L	Date Executed:	Test Conductor:
Title: DAAC Schedule Generation		
Objective: The DAAC Schedule Generation test case is designed to test the DAAC’s operational capabilities in requesting, accessing and making use of scheduling information received from the SMC. The test starts with a request by the DAAC to be included in an upcoming schedule-related-event. This involves an already distributed SMC schedule. This test case will demonstrate that the DAAC has capabilities to receive and accept schedule directives from the SMC, verify access to system-wide scheduling information provided, and convey non-instrument related schedules for ground operations within the DAAC and other ECS sites.		
Requirements	Acceptance Criteria	
DADS1980#A	This requirement is verified through demonstration. Each DADS shall receive from the SMC scheduling directives for system level, site/element-to-site/element, testing, and simulation activities. The LaRC DAAC must be able to receive scheduling directives from the SMC.	
DADS2110#A	This requirement is verified through demonstration. The DADS shall provide scheduling information to the SMC. The LaRC DAAC must make scheduling information available to the SMC via the CSS Bulletin Board..	
DADS2120#A	This requirement is verified through demonstration. The DADS shall have access to the system wide scheduling information. Such information includes, at a minimum, ESDIS Policies and Procedures regarding instrument and ground event scheduling, other element plans and schedules, element allocations of ground event functions and capabilities, product thread information, and scheduling directives for testing, maintenance, and emergency situations. The LaRC DAAC must be able to access system wide scheduling information.	
DADS2210#A	This requirement is verified through demonstration. Each DADS shall provide tools for the creation and manipulation of its plans/schedules. Tools for scheduling must be present at LaRC. During the test, these tools must be used to create daily, 10 day and 30 day schedules.	
Test Inputs: SMC schedule directive		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	<p>Production Planner: Reviews objectives for processing for the coming month. Considerations are:</p> <ul style="list-style-type: none"> - SS Stability, - IT input, and - Project directives. <p>Notes that the current PR for a CERES product is due to expire. The IT for a CERES has requested that the PR be reissued for the next month.</p>	
20	Expected Result: E-mail from ITs to operations is supported. Depending on local DAAC policy, the lead SCF may also access production request editor directly to enter production requests.	
30	Production Planner: Starts the production request editor from the normal operators desktop.	
40	Expected Result: The production request editor displays on the screen.	
50	Production Planner: Selects the option to access the existing PRs. A window is open that provides the collection of fields that constitute a PR.	
60	Expected Results: The production request editor provides several fields to be input by the user.	
70	<p>Production Planner: In the "Instrument" field, the planner selects CERES from a list of options.</p> <p>From the "Processing Level/Description" field, the planner selects "ERBE-like" processing.</p> <p>From the "PGE" field, the planner selects the PGE ID that is the most current for the ERBE-like processing, which is the default.</p> <p>Scrolls through the list of user parameters and corresponding values, but makes no changes.</p> <p>Scrolls through a list of paired start/stop dates for processing that have been previously entered for this configuration of times and user parameters.</p> <p>Enters in a new pare of start/stop date values corresponding to the monthly period requested by the CERES IT.</p> <p>Clicks 'Add PR' and exits the production request editor window.</p>	
80	Expected Results: The system uses the production request to generate a series of data processing requests. Each DPR corresponds to the execution of a single PGE. At this point, the availability of the data required for each DPR is checked, either from the data server if the data are previously ingested, or from internal predictions if the data are expected to arrive in the future. Also, at this point, the data to be output from the DPR are calculated to generate predictions of what may be available for subsequent PGEs.	
90	<p>Production Planner: Creates a plan for the coming month.</p> <p>Starts the planning workbench.</p>	

100	Expected Result: The planning workbench is started from the normal operators desktop	
110	Production Planner: Selects the New Plan option.	
120	Expected Results: The planning workbench displays the options available.	
130	Production Planner: Indicates the time period (start/stop dates) for which he wishes to develop a plan.	
140	Expected Results: The planning workbench is configurable for each DAAC to suit their needs. The planning workbench displays PRs that are applicable to the specified planning interval. Each PR is identified by a row in the list which contains information such as the PR name, PGE ID, priority, time period, comments and whether the PR has been scheduled for this plan.	
150	Production Planner: The planner is uncertain concerning the details of one of the PRs displayed and selects to view the details for the PR instead.	
160	Expected Results: The system displays a detail screen for a single PR, identifying all of the information describing the job.	
170	Production Planner: Reverts to the PR scrollable list display and selects all of the PRs applicable to this period.	
180	Expected Results: The list of all possible PRs are selected for inclusion in the planning activity. Viewing the PRs either via the PR detail GUI or the PR scrolling list, the operator can select or deselect individual PRs and change their priority or toggle them to be scheduled or unscheduled.	
190	Production Planner: After selecting the PRs to be run during the planning interval, Selects "Schedule" to indicate completion of PR selection.	
200	Production Planner: Clicks on "Timeline" which creates a plan from the selected PRs and presents it as a timeline display.	
210	Expect Results: The system uses the selected PRs, information concerning the projected run time of the jobs, system resource projections including ground event activities, and priorities associated with jobs to develop a monthly plan.	
220	Production Planner: Considers the resulting plan. Notes that not all the intended processing objectives are accomplished. This is the result of the large amount of ground event time allocated to production resources during this interval to meet certain test objectives. Decides to develop a second candidate plan where the priority of some reprocessing activities are lowered to allow standard processing objectives to be met. The planner is aware that the testing activities will be completed shortly after and that sufficient resources will be available to keep current with standard processing and work off the backlog of reprocessing. Exits from the plan viewing GUI, saves the current plan, and returns to the plan creation activity.	
230	Expected Results: The plan creation activity is displayed on the screen.	
240	Production Planner: Reviews the list of PRs selected previously. Selects a PR corresponding to a reprocessing activity.	

250	Expected Results: The reprocessing activity PR is displayed.	
260	Production Planner: Modifies the priority level for the PR for the time period and selects “Schedule” to indicate completion of PR modification.	
270	Expected Results: The planning system can save multiple plans during a session that can be retrieved later in the session. The priority can be changed from the PR Id list GUI.	
280	Production Planner: Clicks on “Timeline”.	
290	Expected Results: The planning system can save multiple plans during a session that can be retrieved later in the session. The priority can be changed from the PR Id list GUI.	
300	Production Planner: Considers the second candidate plan created. The expected result of the priority change is achieved. The planner saves this monthly production plan.	
310	Expected Results: The planning system can save multiple plans during a session that can be retrieved later in the session. The priority can be changed from the PR Id list GUI.	
320	Production Planner: Exits from the plan creation GUIs.	
330	Expected Results: The planning workbench is displayed.	
340	Production Planner: Selects “Baseline Plan” to establish a point of comparison to be used for “Planned vs. Actual” comparisons.	
350	Expected Results: The planning workbench creates a tabular presentation of the information contained in the plan and transfers the resulting document to the Document Data Server (DDS) where it will be available to the public. (A graphical version of this plan accessible via the DDS is TBD).	
360	Production Planner: Creates a Weekly Plan for the coming week. The underlying information in the planning system data base is the same for both the monthly plan and the Weekly Plan, but reports generated provide more detailed information. Selects the “Open” option to open an existing plan for the week.	
370	Expected Results: The planning workbench displays the options available.	
380	Production Planner: Reviews and updates the selected PRs where required reflecting planning meetings and comments.	
390	Expected Results: The planning workbench displays the options available.	
400	Production Planner: Clicks on “Timeline” to view the resulting plan for the time period. The planner considers the plan created. The expected result of the priority change is achieved.	
410	Expected Results: The planning workbench displays the timeline.	
420	Production Planner: Saves the this monthly plan.	
430	Expected Results: The planning workbench displays the options available.	
440	Production Planner: Exits from the plan creation GUIs.	
450	Expected Results: The planning workbench is displayed.	

460	Production Planner: Selects "Baseline Plan" to establish a point of comparison to be used for "Planned vs. Actual" comparisons for the weekly plan.	
470	Expected Results: The planning workbench creates a tabular presentation of the information contained in the plan and transfers the resulting document to the Document Data Server (DDS) where it will be available to the public. (A graphical version of this plan accessible via the DDS is TBD).	
480	Production Planner: Reviews the production schedule for the next day of processing. Then, selects the current weekly plan being used for the activation/schedule seeding operation to activate the schedule.	
490	Expected Results: Information from this most current weekly plan will be rolled into the processing system COTS scheduler. The planning workbench options are displayed.	
500	Production Planner: Selects "Activate Plan" from the planning workbench options.	
510	Expected Results: The plan for the day is updated to reflect any changes in the PDPS Planning database such as the status of DPRs that were previously activated for processing, or changes in the resource allocation timeline for processing.	
520	Production Planner: Enters the time range of the scheduling period, and any comments appropriate to the schedule and selects Activate.	
530	Expected Results: The system creates an ordered list of the activities which are currently active in data processing and integrates with it other activities that may be scheduled within the scheduling window or time period. The planning system processes the list: if the DPR is already active (i.e., in the data processing system), the entry available to the data processing system is updated to insure the most current information with possible priority adjustments. If the DPR is not active, it is scheduled into the data processing system.	
540	Production Planner: Reviews the resulting schedule and accepts the results.	
550	Expected Results: The system returns to the Planning Workbench. The data processing system will initiate PGE jobs according to the schedule of jobs transferred from the planning system.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.2.1.2 SMC Schedule Generation

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.2.2 Schedule Adjudication Sequence

The Schedule Adjudication Sequence primarily involves the SMC, to confirm the process for adjudicating ECS schedules. The ECS systems scheduler's abilities to detect, analyze, adjudicate, distribute decisions; and monitoring actions resulting from schedule conflicts are confirmed. The

SMC capability for distributing schedule adjudication results (including to LaRC) is assessed based on comparison with ECS requirements. Finally, system and site procedures for monitoring ECS and each site's progress and thoroughness in making on-site schedule adjustments based on approved adjudication results are inspected.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DPS, DSS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interface (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) is listed:

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Production Planner

DAAC Production Monitor

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (607/OP1), that was used to develop tests in this sequence of tests are listed:

Replanning Production Scenario (Section 3.12.2)

Test Dependencies: The following table identifies the test procedure(s) for this sequence of tests that should be run prior to or concurrently with this test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080220.010\$L	A080220.010\$S	Concurrent

8.2.2.1 Adjudication of ECS Site Conflicts

TEST Procedure No.: A080220.020\$L	Date Executed:	Test Conductor:
Title: Adjudication of ECS Site Conflicts		
Objective: The Adjudicate ECS Site Conflicts Caused by Failed Subsystem Components test case verifies requirements to perform analysis and conflict resolution in response to schedule or resource contention between DAAC subsystem components. It verifies that conflicts are identified and corrective action initiated for partitions of ECS functions at a DAAC site. For example, an instance of resource or schedule conflict caused by: failed operation of site hardware, delayed access to archived data, improper execution or performance of system software, and improper execution or performance of application (ECS services) level software will result in a notification of resource contention being posted by the LSM.		
Requirements	Acceptance Criteria	
DADS2090#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall reevaluate its schedule after receiving new orders from the IMS.</p> <p>The ECS scheduler must accept changes and modifications to existing schedules.</p>	
DADS2210#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall provide tools for the creation and manipulation of its plans/schedules.</p> <p>During this test, planning and scheduling tools must be usable by the operations staff to modify existing schedules</p>	
DADS2220#A	<p>This requirement is verified through demonstration.</p> <p>Each DADS shall provide tools for manually overriding any of its schedules with other elements.</p> <p>Manual override tools for schedules must be present at LaRC. During the test, these tools must be used to override schedules.</p>	
SMC-1345#A	<p>This requirement is verified through test.</p> <p>The LSM shall perform priority management services to resolve conflicts for ECS resources.</p> <p>The LSM must perform priority management services to resolve conflicts for ECS resources.</p>	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Production Monitor: Notices (via the AutoSys TimeScape GUI) that the planned for objectives of the shift are not being met. Processing has fallen behind schedule. Anticipating questions when products do not appear at the times planned, suggests to the Production Planner that replanning may be advisable to get new projections.	
20	Production Planner: Concurs and starts the planning workbench.	
30	Expected Results: The planning workbench appears on the screen displaying the available options.	
40	Production Planner: Selects and opens the current weekly plan being used for the activation/schedule seeding operation.	
50	Expected Results: The current weekly plan is displayed.	
60	Production Planner: Reviews the resulting schedule and modifies the priority level for the PR for the time period and selects "Schedule" to indicate completion of PR modification.	
70	Expected Results: The planning system saves the plans.	
80	Production Planner: Clicks on "Timeline" to view the resulting plan for the time period. The planner considers the plan created	
90	Expected Results: The planning workbench displays the timeline.	
100	Production Planner: Exits from the plan creation GUIs.	
110	Expected Results: The planning workbench is displayed.	
120	Production Planner: Selects "Baseline Plan" to establish a point of comparison to be used for "Planned vs. Actual" comparisons.	
130	Expected Results: The planning workbench creates a tabular presentation of the information contained in the plan and transfers the resulting document to the Document Data Server (DDS) where it will be available to the public. (A graphical version of this plan accessible via the DDS is TBD).	
140	Production Planner: Selects "Activate Plan" from the planning workbench options.	
150	Expected Results: Information from this updated plan is rolled into the processing system COTS scheduler.	
160	Production Planner: Enters the time range of the scheduling period, enters any comments appropriate to the schedule and selects Activate.	

170	<p>Expected Results: The system creates an ordered list of the activities which are currently active in data processing and integrates with it other activities that may be scheduled within the scheduling window or time period.</p> <p>The system initiates PGE jobs according to the schedule of jobs transferred from the planning system.</p>	
Data Reduction and Analysis Steps: At the completion of the test, the actions taken by the LSM are inspected for conformance with expected results.		
Signature:		Date:

8.3 ECS Site Upgrade Scenario

This scenario traces the steps taken by the M&O staff in the process of implementing changes to the ECS site environment. It carries the maintenance personnel through established procedures for system upgrades and enhancements.

The purpose of this scenario is to provide confirmation of the SMC's, each site's, and the total system's ability to successfully evolve through installation of minor enhancements and major upgrades. ECS overall and site capability for ascertaining the validity and assessing impacts of requested modifications is inspected.

8.3.1 Enhancements Sequence

This sequence conducts the AT reviewers through ECS site procedures for coordinating site enhancements with the ECS systems level team. ECS site policy and procedures are inspected to evaluate in-site enhancement policies. Analysis is performed to provide evidence that proper coordination actions with SMC takes place that update SMC retained site architecture's procedures to reflect the newly installed enhancement. Site procedures are reviewed for assurance that integrated system-level enhancement related policies and procedures are in force within ECS sites.

LSM procedures for receiving monitoring and reporting on SMC originated site enhancements are assessed. LSM procedures and activities for coordinating with site management and monitoring site implementation team enhancement activities, to confirm appropriate use of integrated toolkits and standard user interfaces are evaluated.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, & ISS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

GSFC ECS DAAC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence are listed:

DAAC User Services Representative

Screening Committee

SMC CM Administrator

SEO

LaRC Site CCB

(includes DAAC Operations Supervisor, DAAC Resource Manager, others TBD)

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that was used to develop tests in this sequence of tests are listed:

System Enhancement Scenario (Section 3.4.7)

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.3.1.1 ECS Enhancements

TEST Procedure No.: A080320.010\$L		Date Executed:		Test Conductor:		
Title: ECS Enhancements						
Objective: This test provides ECS software, hardware and general managers with assurance that the LaRC DAAC has satisfactory software enhancement procedures in place. Each applicable written policy, procedures and as-built architecture specifications for managing and performing system enhancements are required inputs for this test case. Procedures are inspected for satisfactory life cycle coverage of enhancement initiation, implementation, and installation. Enhancement configuration management procedures are inspected and compared with enhancement procedures for specification of timely reviews and baseline updates that assure the site’s ability to update and retain configuration status.						
Requirements		Acceptance Criteria				
SMC-2535#A		This requirement is verified through demonstration. Upon approval of an enhancement, the LSM must facilitate the implementation of the approved changes within an elements hardware and software. During the test, LSM must assist in installing the software enhancement from the SMC.				
Test Inputs:						
Data Set Name		Data Set ID	File Name		Description	Version
SW_001					S/W enhancement file	
CCR_001					CCR	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	User Services Representative: Accesses URDB to submit an enhancement recommendation for one of the ECS custom toolkits.	
20	Expected Results: URDB input screen is displayed on the screen.	
30	User Services Representative: Enters his/her name, e-mail address, phone number, agency's name, recommendation title, and the recommendation.	
40	Expected Results: The system provides an ID number for future reference to this recommendation.	
50	Screening Committee: Accesses the URDB.	
60	Expected Results: URDB displays the enhancement recommendation.	
70	Screening Committee: Reviews the enhancement recommendation, determines that the recommendation has merit, has system-wide impact, and should be submitted via a configuration change request (CCR) to ESDIS CCB for approval. Screening Committee Member (SCM): Changes status of recommendation to reflect its consideration for implementation.	
80	Expected Result: URDB stores the status update.	
90	SCM: Executes DDTS to compose the CCR.	
100	Expected Results: The DDTS displays on the screen.	
110	SCM: Clicks the "Submit" button to bring up the CCR input screen.	
120	Expected Results: The DDTS displays the CCR input screen.	
130	SCM: Enters the class and project name for the CCR.	
140	Expected Results: The DDTS accepts the input and displays the CCR form.	
150	SCM: Enters the name of the toolkit, version number, descriptive title for the CCR, recommended priority, recommendation (includes references to the URDB ID number) on the form and then clicks the "Commit" button.	
160	Expected Results: The DDTS stores the CCR information in its data base, sets an initial state (new), and sends e-mail notification of its existence to the SMC CM Administrator and the SEO.	
170	SEO Staff Member (SM): Receives e-mail notification and accesses DDTS.	
180	Expected Results: DDTS displays the CCR.	
190	SM: Reviews the CCR and prints it to a designated file.	
200	Expected Results: DDTS prints a copy of the CCR to a designated file.	

210	SM: Executes e-mail.	
220	Expected Results: E-mail is displayed on the screen.	
230	SM: Composes a message attaching a copy of the CCR addressed to each site's SE for an impact assessment and sends the message.	
240	Expected Results: E-mail facility transmits the message with the attached CCR file to each site and notifies the recipients that they have mail.	
250	Site SE: Executes e-mail.	
260	Expected Results: E-mail is displayed on the screen.	
270	Site SE: Opens and assesses the message and attached CCR. Creates a forwarded message addressed to the site CM Administrator, the message contains assessment information such as the purpose of the assessment, name of requesting agency, impact to site resources, benefits to site, recommendation, and a copy of the CCR. Sends the message.	
280	Expected Results: E-mail facility transmits the message with the attached CCR file to the Site CM Administrator and notifies the recipient that he/she has mail.	
290	Site CM Administrator: Executes e-mail.	
300	Expected Results: E-mail is displayed on the screen.	
310	Site CM Administrator: Opens and assesses the message and attached CCR and forwards a message addressed to the site CCB for review and approval. Sends the message.	
320	Expected Results: E-mail facility transmits the message with the attached CCR file to the Site CCB and notifies the recipient that he/she has mail.	
330	Site CCB: Executes e-mail.	
340	Expected Results: E-mail is displayed on the screen.	
350	Site CCB: Opens, reviews and approves the assessment.	
360	Site SE: E-mails site assessment to the SEO.	
370	Expected Results: E-mail facility transmits assessment to SEO and notifies the recipient.	
380	SEO SM: Executes e-mail.	
390	Expected Results: E-mail is displayed on the screen.	
400	SEO SM: Opens and reads the sites' assessments.	
410	Expected Result: Assessment appears on the screen.	
420	SEO SM: Accesses DDTS.	
430	Expected Results: DDTS appears on the screen.	
440	SEO SM: Selects the CCR in the index.	
450	Expected Results: The CCR appears on the screen.	
460	SEO SM: Clicks the "Modify" button and then selects the "Add Enclosure" option.	
470	Expected Results: The "Add Enclosure" window appears.	

480	SEO SM: Enters the summary of the impact assessments, cost estimates, and recommendation. Then, executes the editor's File Menu's save option and enters an enclosure title.	
490	Expected Results: DDTS saves the information under the entered enclosure title.	
500	SEO SM: Uses the "Add Enclosure" feature to insert each of the sites' assessment file into an enclosure and names each site's assessment enclosure accordingly.	
510	Expected Results: DDTS saves the content of each file under the entered enclosure title. DDTS sends e-mail notification of the update to the CCR originator, the URDB SCM	
520	SEO SM: Selects the "File" menu then selects "print."	
530	Expected Results: DDTS prints the CCR.	
540	SEO SM: Sends a card copy of the CCR to the ESDIS CCB for review and approval.	
550	ESDIS CCB: Reviews and approves the CCR and issues implementation instructions.	
560	SMC CM Administrator: Accesses URDB.	
570	Expected Results: the URDB is displayed.	
580	SMC CM Administrator: Updates the recommendation record to reflect ESDIS CCB's decision.	
590	Expected Results: URDB stores the information.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4 Configuration Management Scenario

This scenario of tests verify the ECS capability to perform system-level configuration management. Resource management procedures are evaluated for effective, complete and prompt coordination and movement between ECS sites, of resources, and resource related procedures and permissions, such as operational directives and COTS software usage licenses and unlicensed toolkits. The logistics management activities are assessed for their combined ability to monitor and communicate information concerning spares and consumable inventories and replenishment.

The completeness, effectiveness and the degree of comprehensives of the ECS capability for controlling and maintaining system-wide inventories including evaluation of previous or on-going inventory procedures are assessed. ECS system-level quality management is evaluated for its ability to assess overall ECS performance within the SMC, for effective SMC/LSM coordination, and for satisfactory LSM quality assurance procedures. The ECS capability for collecting controlling, maintaining and distributing ECS system-level policies and procedures is evaluated as well as the capability of providing, maintaining, and updating a bulletin board service for publishing current ECS status, events, news and toolkit references and updates. AT configuration management evaluations include assessment of the ECS network management capability for providing control of network configuration parameters and resources.

8.4.1 Resource Management Sequence

This sequence of tests verify the ECS capability to perform resource management activities for providing system-level information, equipment and software resources to the LaRC site. The site management and operations team demonstrates the SMC capability to generate and send ground operations events to sites for implementation, as well as the LSM capability for conveying, monitoring and reporting to the SMC on the status and progress of the implementation of these activities. The SMC procedures for making available system-level toolkits for automated distribution to the LaRC site is also inspected, including procedures for distributing unlicensed toolkit components, licenses for commercial products, product upgrades and user/maintenance documentation.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DPS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Production Monitor

DAAC Computer Operator

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that were used to develop tests in this sequence of tests are listed:

Resource Planning Scenario (section 3.7)

Resource Management and Control Scenario (section 3.8)

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080410.010\$L	A080410.010\$S	prior

8.4.1.1 Resource Management Directive

TEST Procedure No.: A080410.010\$L	Date Executed:	Test Conductor:		
Title: Resource Management Directive				
Objective: This test case investigates the SMC M&O staff's ability to generate managerial and operational directives, such as directives involving operational status, resource allocation and upgrade to the sites' LSM M&O procedures.				
Requirements		Acceptance Criteria		
EOSD2660#A		This requirement is verified through demonstration. ECS elements shall at all times maintain and comply with the security directives issued by the SMC. The Tester demonstrates that the system provides the capability to view a security directive that was previously transmitted and stored in the database from the SMC.		
SMC-2115#A		This requirement is verified through demonstration. The LSM shall convey for LaRC implementation, the managerial and operational directives regarding the allocation or upgrade of any hardware and scientific and systems software. The Tester demonstrates that the system provides the capability to display a policy, procedure, or directive that was previously transmitted and stored in the database from the SMC.		
Test Inputs: none				
Data Set Name	Data Set ID	File Name	Description	Version
Resource Directives			Hard/soft copies	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Computer Operator: Logon to the AIT workstation at the LaRC DAAC. The office automation tools must be available on the workstation.	
20	DAAC Computer Operator: Select the tools option from the menu.	
30	Expected Results: The tools menu is displayed.	
40	DAAC Computer Operator: Select the option for office automation.	
50	Expected Results: The office automation menu is displayed.	
60	DAAC Computer Operator: Select the option for GhostView and follow directions to view a document.	
70	NOTE: To view a policy, procedure, or directive that was previously transmitted and stored in the database from the SMC. DAAC Computer Operator: Choose open under the file button and select the desired file to view.	
80	Expected Results: The selected file is displayed.	
90	DAAC Computer Operator: Select the print button.	
100	Expected Results: The selected file is printed.	
110	DAAC Computer Operator: Select close to close the desired file.	
120	DAAC Computer Operator: Select quit to exit the processor.	
130	Expected Results: The MSWindows Program Manager appears.	
140	note: To view the DAAC files for operational status, resource allocations, or any system upgrades. DAAC Computer Operator: Select the MSWindows option from under the Office Automation option.	
150	Expected Results: The MSWindows' Program Manager is displayed.	
160	DAAC Computer Operator: Select the file button.	
170	Expected Results: The file menu is displayed under a disk drive.	
180	DAAC Computer Operator: Select the correct disk drive and the file in either Microsoft Word or Excel format and select the open button to view the document.	
190	Expected Results: The document is displayed.	
200	DAAC Computer Operator: Select print to print the document if desired.	
210	DAAC Computer Operator: Insert or delete changes into the desired file, then select save.	
220	Expected Results: The changes are saved in the document.	

230	DAAC Computer Operator: To exit the processor select quit.	
240	Expected Results: The MSWindows program manager appears.	
250	DAAC Computer Operator: To end this test exit Windows.	
260	Expected Results: The SSIT Manger-Operator View is displayed.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.1.2 Sufficient Storage

TEST Procedure No.: A080410.040\$L	Date Executed:	Test Conductor:
Title: Sufficient Storage		
Objective: This test confirms the capability of ECS to provide sufficient storage for the Client subsystem, Sustaining Engineering, and IV&V.		
Requirements	Acceptance Criteria	
EOSD1140#A	This requirement is verified through analysis. ECS shall allocate 10% of development resources (the ECS Sustaining Engineering Facility at GSFC), including processing, storage, and networks, for the IV&V activity. Analytic and static analysis models along with daily performance reports are used to verify this requirement.	
IMS-1790#A	This requirement is verified through analysis. The IMS shall provide, based upon the data model defined in Appendix C, sufficient storage for, at a minimum: a. Directory metadata b. Guide (documentation/reference material) metadata c. Inventory metadata d. System space, LSM data, and data base system overhead e. Metadata staging area f. Spacecraft housekeeping and ancillary data metadata g. Science processing library software metadata h. Summary data statistics i. User workspace This requirement is verified at the end of each day using log files and accounting report.	
Test Inputs: There are no input data sets for this test procedure.		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
	There are no step-by-step procedures.	
Data Reduction and Analysis Steps: A. Analytic and static analysis models along with daily performance reports from the Release A DAACs and EBnet will be used to verify the design of SMC to accommodate 100 percent growth in processing speed. B. Static analysis models along with daily performance reports from the Release A DAACs and EBnet will be used to verify the design of SMC to accommodate 100 percent growth in storage capacity. C. Performance reports from the Release A DAACs and EBnet are used for DAACs site and network trend analysis. The Tivoli and Openview tools are used at the SMC to determine resources impact.		
Signature:		Date:

8.4.2 Maintenance Management Sequence

This sequence is not applicable for the LaRC ECS DAAC Volume of the Acceptance Test Procedures document for Release A.

8.4.3 Logistics Management Sequence

This sequence reviews ECS capabilities for managing system-level logistics management activities and for managing system-level personnel and resources in logistics control activities. The AT team inspects SMC's procedures for developing and updating a system-level logistics management database containing historical, current and planned logistics commitments. The LaRC policies and procedures are inspected for the existence and completeness of procedures for receiving logistics management directives and for monitoring, statusing and reporting to SMC on LaRC activities in response to logistics related directives.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & DMS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed :

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Resource Manager

DAAC Computer Operator

Operational Scenario(s): There are no operations scenarios taken from the Operations Scenarios for the ECS Project: Release-A, used during this sequence of tests.

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
none		

8.4.3.1 Logistics Monitoring

TEST Procedure No.: A080430.010\$L		Date Executed:		Test Conductor:	
Title: Logistic Monitoring					
Objective: This test case verifies that the LSM has the capability to monitor the spares and consumable inventory.					
Requirements		Acceptance Criteria			
SMC-2305#A		This requirement is verified through demonstration. The LSM shall monitor the spares inventory within its element. The Tester demonstrates that the system provides the capability to use the LSM logistics monitoring procedure information, track the location, quantity, status, and consumption rate concerning spares and consumables.			
SMC-2325#A		This requirement is verified through demonstration. The LSM shall monitor the consumable inventory within its element for items used by the system including, at a minimum: a. Computer tapes b. Computer disks c. Computer paper The Tester demonstrates that the system provides the capability to manually input the required list of consumables and a spare part to be displayed (computer tapes, disks, and paper), and record the quantity and status of three consumable items (computer tapes, computer disks, and computer paper) as contained in the data base.			
Test Inputs: Lists of inventory for spares and consumables such as, computer tapes, disks, and paper.					
Data Set Name	Data Set ID	File Name	Description	Version	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Computer Operator: Login to ECS	
20	DAAC Computer Operator: Open the Inventory file management directory.	
30	Expected Result: Inventory file is ready for access.	
40	DAAC Operations Supervisor: Using the LSM logistics monitoring procedure information, track the location, quantity, status, and consumption rate concerning spares and consumables.	
50	DAAC Operations Supervisor: Manually input the required list of consumables and spare part to be displayed (computer tapes, disks, and paper). Record the quantity and status of three consumable items (computer tapes, computer disks, and computer paper) as contained in the data base.	
60	Expected Result: All required characteristics for running the query is recorded and processed.	
70	DAAC Computer Operator: A physical inspection of the inventory is made at the site to obtain the actual quantity and status of the three consumable items.	
80	Expected Result: The inventory list of the computer consumables and spare part is the same as the result of the physical inspection.	
90	DAAC Computer Operator: Compare the computer generated inventory list with the test input supplied list.	
100	Expected Result: There is no discrepancies between the data base information and the quantity and status of consumable items and spare parts actually available at the site.	
110	DAAC Computer Operator: Record any missing inventory or discrepancy in the evaluation report. The lists should compare.	
120	Expected Result: The lists compare.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.3.2 Logistics Replenishment

TEST Procedure No.: A080430.020\$L	Date Executed:	Test Conductor:		
Title: Logistics Replenishment				
Objective: This test case verifies that the LSM has the capability to manage, replenishment of spare parts and consumable items.				
Requirements		Acceptance Criteria		
SMC-2315#A		This requirement is verified through demonstration. The LSM shall manage the replenishment of spare parts within its element. The Tester demonstrates that the system provides the capability to replenish spare parts and consumable items.		
SMC-2335#A		This requirement is verified through demonstration. The LSM shall manage the replenishment of consumable items for its element. The Tester demonstrates that the system provides the capability to replenish spare parts and consumable items.		
Test Inputs: Lists of inventory for spares and consumables such as, computer tapes, disks, and paper.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Operations Supervisor: Review the procedures for overseeing and managing, respectively, the replenishment of spare parts and consumable items.	
20	DAAC Computer Operator: Login to ECS.	
30	DAAC Computer Operator: Open the Inventory file management directory.	
40	Expected Result: Inventory file is ready for access.	
50	DAAC Computer Operator: Bring up the data base and change the current quantities of consumable items accordingly.	
60	DAAC Computer Operator: Manually input the required list of consumables and spare part to be displayed (computer tapes, disks, and paper).	
70	Expected Result: All required characteristics for running the query is recorded and processed.	
80	DAAC Computer Operator: List the consumables and spare part.	
90	Expected Result: The inventory list of the computer consumables and spare part is displayed.	
100	DAAC Computer Operator: Check consumerable and spare part list for shortfalls.	
110	Expected Result: If a shortfall exists an alert or warning message will be generated and displayed. No shortfalls should exist.	
120	DAAC Computer Operator: Order any shortfall item.	
130	Expected Result: Change in the data base to indicate the items have been ordered.	
140	DAAC Computer Operator: Record any discrepancy in the new inventory list.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.4 Training Management Sequence

This sequence provides the methodology for the inspection of ECS capabilities for managing system-level training and for supplying system-level personnel and courseware in performing on-site courses. It inspects the established database architecture to confirm the SMC's ability for developing and updating a system-level training management information base containing historical, current and planned schedules courseware availability, training commitments and budgets pertaining to system training activities. The SMC training policy and procedures are inspected for specification of management activities for providing system-level assistance in

managing site training. The procedures, at LaRC, are inspected for the existence and completeness of procedures for receiving training management directives and for monitoring, statusing and reporting to SMC on site activities in response to SMC originated training directives. The SMC training policies and procedures are inspected for specification of specific assistance activities in assisting and providing system-level skills and resources to assist in site-level training and courseware development, including personnel skills, multi-site training tools and system-level training courseware toolkits. The procedures, at LaRC, are inspected for the existence and completeness of procedures for applying available SMC training resources within their assigned facilities. SMC procedures for monitoring and evaluating training course conduct and training effectiveness at the system and site levels are inspected.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & DMS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed :

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Resource Manager

DAAC Computer Operator

Operational Scenario(s): There are no operations scenarios taken from the Operations Scenarios for the ECS Project: Release-A, used during this sequence of tests.

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080640.030\$L	A080640.030\$S	concurrent

8.4.4.1 ECS Training and Certification Program Management

TEST Procedure No.: A080440.010\$L		Date Executed:		Test Conductor:	
Title: ECS Training and Certification Program Management					
Objective: The Training and Certification Program Management test verifies that the ECS SMC training facility develops plans for conducting training courses.					
Requirements		Acceptance Criteria			
SMC-2405#A		<p>This requirement is verified through analysis.</p> <p>The LSM shall coordinate with the SMC in managing the training program for its element.</p> <p>The OA tools assists the SMC training staff in determining training requirements for various operator positions, tracking resources for training, and maintaining training course information. The OA tools support the management of training and certification programs for the ECS.</p> <p>Manually. Performed by M&O staff using phone, e-mail, or through access to site's training planning documents.</p>			
SMC-2415#A		<p>This requirement is verified through analysis.</p> <p>The LSM shall receive from the SMC descriptions and schedules for training courses.</p> <p>Using the Training database, the SMC training staff uses the information to assist in the following planning activities: scheduling dates of training courses, developing training courses, scheduling training resources (system equipment, software, instructional materials), and scheduling personnel to support training. The ECS training database is updated with all of the scheduling information and formatted into a Training Schedule Report. This report is disseminated to the ECS site managers via the ECS training bulletin board as the proposed training schedule.</p> <p>Manually. Performed by M&O staff using e-mail and remote access to office automation tools.</p>			
Test Inputs: Written plans for conducting training and certification programs for the ECS. Training database.					
Data Set Name	Data Set ID	File Name	Description		Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Resource Manager: Review the procedures for the overseeing and managing of training and certification programs for ECS.	
20	Expected Result: The procedures determining training requirements for various operator positions, tracking resources for training, and maintaining training course information are reviewed.	
30	DAAC Computer Operator: Login to ECS.	
40	DAAC Computer Operator: Open the file from the SMC containing plans for conducting training and certification programs for ECS..	
50	Expected Result: File open and ready for access.	
60	DAAC Resource Manager: Using the site information on the personnel training needs, the number of people requiring training, and unique training requirements. Query the database for the purpose of scheduling a training course.	
70	Expected Result: Information is collected from the training database.	
80	DAAC Resource Manager: Schedule a training course from the SMC.	
90	Expected Result: The SMC training staff contacts the site DAAC Resource Manager, via Email, to obtain information on the personnel training needs, and the number of people requiring training.	
100	SMC Training Staff: Using the Training database, the information is accessed in the following planning activities: scheduling dates of training courses, developing training courses, scheduling training resources (system equipment, software, instructional materials), and scheduling personnel to support training.	
110	Expected Result: A training course is scheduled.	
120	SMC: The training database is updated with all of the scheduling information and formatted into a Training Schedule Report.	
130	Expected Result: The training schedule report is disseminated to the DAAC Resource Manager via the ECS training bulletin board as the proposed training schedule.	
140	Expected Result: Training registration for the course is done by Email. A confirmation of the training registration application is transferred via Email.	

Data Reduction and Analysis Steps:

After the information from GSFC has been entered into the Training database the following steps occur:

A. The SMC uses the information to assist in planning activities for scheduling, dates of training courses, developing training courses, scheduling training resources (system equipment, software, and scheduling personnel to support training.

B. The training database is updated with scheduling information.

C. This information is disseminated to GSFC via the ECS training bulletin board as the proposed training schedule.

D. After review and consideration by GSFC, the SMC finalizes the training course schedule and makes it available via the ECS training bulletin board.

E. Training registration is done by Email. A confirmation of all training registration applications is transferred via Email.

Signature:**Date:****8.4.4.2 On-the-Job Training**

This test procedure is not applicable for the LaRC Volume of the acceptance Test Procedures document for Release A.

8.4.5 Inventory Management Sequence

This sequence provides the methodology for test inspection of ECS capabilities for providing and maintaining a configuration management (CM) system, maintaining inventory data bases, managing system-level inventory policy and procedures, and participating and contributing system-level skills and resources in performing site-level inventory activities. The tester inspects the SMC's procedures and policy for planning, establishing and maintaining a system-wide inventory of all hardware, science software, system software, and associated documentation within ECS.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS, DPS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed :

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607-CD-001-002) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Resource Manager

DAAC Computer Operator

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605-CD-001-003), that were used to develop tests in this sequence of tests are listed:

Configuration Management Scenario (Section 3.4)

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
none		

8.4.5.1 Inventory and Configuration Management

TEST Procedure No.: A080450.010\$L		Date Executed:		Test Conductor:		
Title: Inventory and Configuration Management						
Objective To verify that the LSM can establish and maintain a system-wide inventory data base of hardware, system software, and science software and provide a system-wide configuration management (CM) capability.						
Requirements		Acceptance Criteria				
DADS1850#A		This requirement is verified through demonstration. Each DADS shall utilize the configuration management toolkit provided by the SMC. The Tester shows that the system provides the capability for utilizing the configuration management toolkit provided by the SMC.				
DADS1860#A		This requirement is verified through demonstration. Each DADS shall, in conjunction with the SMC, provide configuration management for its internal resources. The Tester shows that the system provides the capability for configuration management of its internal resources.				
IMS-1380#A		This requirement is verified through test. The IMS shall provide the capability to integrate the element toolkits with a common user interface. The Tester tests that the system provides the capability to integrate the element toolkits with a common user interface.				
SMC-2515#A		This requirement is verified through test. The LSM shall provide configuration management for at least the operational hardware, system software, and scientific software within its element and for the migration of enhancements into the operational system. The Tester tests that the system provides the capability for maintaining the inventory of hardware, science software, and system software on a system-wide basis.				
Test Inputs: System inventory data base file of all the hardware, scientific and system software contained in the ECS.						
Data Set Name		Data Set ID	File Name		Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Operations Supervisor: Review the documentation for maintaining the inventory of hardware, science software, and system software on a system-wide basis.	
20	DAAC Computer Operator: Log onto a workstation.	
30	Expected Results: Successful login.	
40	DAAC Computer Operator: Bring up and access the data base, which contains CM information .	
50	DAAC Computer Operator: Check for the established SMC created inventory and configuration management files, using the Clearcase tool.	
60	Expected Result: The files will be identified and located for input/output.	
70	DAAC Computer Operator: Select data base information containing one hardware item .	
80	DAAC Computer Operator: Print the inventory log file information for the one hardware item that contains the, hardware ID numbers, version numbers and dates, manufacturer, part number, and serial number.	
90	Expected Result: The inventory file will be printed.	
100	DAAC Computer Operator: Inspect the identification numbers, manufacturer, part number, and serial number of the actual hardware item and record this information.	
120	Expected Result: The data base information compares with results of the hardware inspection. There should be no discrepancies between the information contained in the data base and the actual items selected for inspection.	
130	DAAC Computer Operator: Select data base information containing one software item .	
140	DAAC Computer Operator: Print the inventory log file information for the one software item that contains the, version numbers and dates, name and locator info for software maintenance, and the location where the software is used.	
150	Expected Result: The inventory file will be printed.	
160	DAAC Computer Operator: Inspect the version numbers and dates, name and locator info for software maintenance, and the location where the software is used.	
170	Expected Result: The data base information compares with results of the software inspection. There should be no discrepancies between the information contained in the data base and the actual item selected for inspection.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.5.2 LSM Enhancement Migration and Inventory Management

TEST Procedure No.: A080450.030\$L	Date Executed:	Test Conductor:		
Title: LSM Enhancement Migration and Inventory Management				
Objective: To verify the capability of the LSM to update the system-wide inventory data base and provide CM for the migration of upgrades and enhancements into the operational system for site-specific items.				
Requirements		Acceptance Criteria		
SMC-2505#A		This requirement is verified through demonstration. The LSM shall update the system-wide inventory data base consisting of all hardware, system software, and scientific software contained within its element. The Tester demonstrates that the system provides the capability for updating the inventory data base for hardware and system and science software.		
Test Inputs: Inventory data base file containing operational system upgrades and enhancements. System must have a configuration management capability in place.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC Operations Supervisor: Review the documentation for updating the inventory data base for hardware and system and science software.	
20	DAAC Operations Supervisor: Use this information to update the data base containing CM information for hardware.	
30	DAAC Computer Operator: Log onto a workstation.	
40	Expected Results: Successful login.	
50	DAAC Operations Supervisor r: Check for the establishment of inventory and configuration management files, using the Clearcase tool load the inventory file.	
60	Expected Result: Inventory file will be loaded and ready for input/output.	
70	DAAC Computer Operator: Retrieve data base information about one specified hardware item .	
80	Expected Result: The identification number, manufacturer, part number, and serial number of the hardware item should be displayed.	
90	DAAC Operations Supervisor: Identify the hardware item to be replaced and provide the ID number, manufacturer, part number, and serial number of the new H/W item. Make the file change.	
100	Expected Result: The original H/W item will be replaced with the new one. This new H/W configuration will be reflected in the inventory data base with the identification number, manufacturer, part number, and serial number of the new hardware item.	
110	DAAC Operations Supervisor: Close out the inventory file.	
120	Expected Result: File will be closed.	
130	DAAC Computer Operator: Using Clearcase, load the CM file containing information about the system and science software data base.	
140	Expected Result: The S/W data base file is opened for I/O operations.	
150	DAAC Computer Operator: Print information for a selected processor from the system and science software data base file, which contains at a minimum the processor name, version, and maintenance performed.	
160	Expected Result: The selected processor information including processor name, version, and maintenance performed is printed.	
170	DAAC Operations Supervisor: Identify the software processor to be replaced and provide the processor name, version, and maintenance performed of the new S/W processor. Make the file change.	

180	Expected Result: The original software processor is replaced with the new one. This new S/W configuration will be reflected in the inventory data base with the processor name, version, and maintenance performed of the new software processor.	
190	DAAC Operations Supervisor: Inspect and compare the printed output with the current software configuration and record any discrepancies. There should not be any discrepancies.	
191	DAAC Operations Supervisor: Reset all data base items to there original values.	
200	Tester: Close the data base file.	
210	DAAC Computer Operator: Log off of the work station.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.5.3 SMC Enhancement Evaluation & Implementation Management

This test procedure is not applicable for the LaRC Volume of the acceptance Test Procedures document for Release A.

8.4.6 Quality Management Sequence

This sequence illustrates to the tester ECS capabilities for establishing and maintaining quality assurance management data bases, for managing system-level quality assurance policy and procedures and for system-level quality assurance for overall ECS performance as well as for specific programmatic areas. The tester also inspects LaRC's procedures to confirm their ability to perform quality assurance for the site, such as site quality testing, benchmarks, audits of site enhancement implementations, site quality checking, processed and delivered quality checks and quality evaluations of site resource usage performance.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & DPS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed :

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Production Monitor

DAAC Computer Operator

DAAC Science Data Specialist

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that were used to develop tests in this sequence of tests are listed:

Performance Management Scenario (Section 3.5)

Test Dependencies: There are test dependencies needed for this sequence of tests.

8.4.6.1 SMC Quality Assurance

This procedure is not applicable for the LaRC Volume of the Acceptance Test Procedure document for Release A.

8.4.6.2 LSM Quality Assurance

TEST Procedure No.: A080460.020\$L	Date Executed:	Test Conductor:		
Title: LSM Quality Assurance				
Objective: To verify that the LSM has the capability to perform quality assurance (QA) activities.				
Requirements		Acceptance Criteria		
SMC-3345#A		<p>This requirement is verified through demonstration.</p> <p>The LSM must perform quality assurance for its site/elements performance as well as programmatic areas that includes, at a minimum:</p> <ul style="list-style-type: none"> a. Quality testing, benchmarks and audits for element enhancement implementations. b. Quality checking and audits of products processed and delivered. c. Quality testing and audits of element resource performance. <p>The Tester demonstrates that the system provides the capability for performing site-specific quality assurance, and that it has policies and procedures to ensure that quality testing, benchmarks and audits for site-specific enhancement implementations can be successfully accomplished, and that the quality testing and audits of DAAC resource performance can be performed.</p>		
Test Inputs: Data base file containing quality assurance information about system quality testing, benchmarks and audits. The availability of performance management tools.				
Data Set Name	Data Set ID	File Name	Description	Version
MET_001			Metadata	
QA_001			Quality Assurance	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Data Specialist: Review the documentation for performing site-specific quality assurance and inspect policies and procedures to ensure that quality testing, benchmarks and audits for site-specific enhancement implementations can be successfully accomplished, and that the quality testing and audits of DAAC resource performance can be performed.	
20	Expected Result: Successful inspection.	
30	Data Specialist: Log onto a workstation.	
40	Expected Results: Successful login.	
	Note: Begin product quality assurance.	
50	Data Specialist: Request a data product (metadata file of simulated ingested data).	
60	Expected Result: The data server archives the product and sends a subscription notice.	
70	Data Specialist: Receives notification of the product and retrieves it from the data server for review.	
80	Expected Result: Product is reviewed and the quality is determined.	
90	Data Specialist: Updates the product metadata QA flag and requests the data server to archive the product.	
100	Expected Result: The data server archives the product and sends a subscription notice.	
110	Data Specialist: Receives notification of a new metadata QA flag attached to the product.	
	Note: Begin quality checking and auditing of products processed and delivered.	
120	Data Specialist: Requests a product retrieval through the data server.	
130	Expected Result: The product is made available from the data server.	
140	Production Monitor (QA); Performs manual QA on the product and sends a product archive request to the data server.	
150	Expected Result: The data server archives the product and sends out a subscription notice.	
160	Production Monitor (QA): Receives the notification.	
170	Expected Result: Accept notification and decide if any further action is needed.	
	Note: Begin performance management reporting	
180	Production Monitor (QA): Query the QA data base, select and print Performance Management report items about the above metadata product.	
190	Expected Result: Printed output containing product processing parameters, such as product size, archive space, media used, number of times distributed, CPU hours, line usage, etc.	

200	Production Monitor: Evaluate the product's quality using QA policies and procedures and perform actions necessary to reflect the appropriate quality assurance code in the product metadata.	
210	Production Monitor: Compare with the quality assurance documentation, recording any discrepancies and inadequacies.	
220	Production Monitor: Logoff the workstation	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.7 Policies and Procedures Management Sequence

This sequence conducts an inspection of ECS/SMC/LSM procedures and policies for supporting, controlling and maintaining ECS/site policies and procedures covering site responsibility and authority, resource management, fault recovery, testing, simulation, maintenance, logistics, performance evaluation, training, quality and product issuance, inventory management, system enhancements, finance management, and administrative actions.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & DPS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Production Monitor

DAAC Computer Operator

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that were used to develop tests in this sequence of tests are listed:

Fault Management Scenario (Section 3.3)

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080480.020\$L	A080480.020\$S	prior
A080480.010\$L	A080480.010\$S	prior

8.4.7.1 Policies and Procedures Control

TEST Procedure No.: A080480.010\$L	Date Executed:	Test Conductor:
Title: Policies and Procedures Control		
Objective: To verify the overall support and control of policies and procedures affecting the ECS.		
Requirements	Acceptance Criteria	
EOSD2100#A	<p>This requirement is verified through inspection. Compliance for this requirement is demonstrated in DfD 214/SE1.</p> <p>The ECS technical security policy planning shall be comprehensive and shall cover at least the following areas:</p> <ul style="list-style-type: none">a. Applicability of the C2 Level of Trustiness as defined by the NSAb. Applicability of the C2 Object Reuse capabilityc. Discretionary control and monitoring of user accessd. ECS communications, network access, control, and monitoringe. Computer system "virus" monitoring, detection, and remedyf. Data protection controlsg. Account/privilege management and user session tailoringh. Restart/recoveryi. Security audit trail generationj. Security analysis and reportingk. Risk analysis <p>The Operations Supervisor demonstrates by inspection that the security management policies and procedures at the site provides for password management, operational security, data classification, access privileges, system hardware and software maintenance, and spare parts inventory guidelines.</p>	
EOSD2200#A	<p>This requirement is verified through inspection. Compliance for this requirement is demonstrated in DfD 214/SE1.</p> <p>Selection criteria meeting overall ECS security policies and system requirements shall be applied when selecting hardware.</p> <p>The Operations Supervisor verifies through inspection that a security section is provided within all applicable documents at the site and is current with the ECS approved documentation.</p>	
Test Inputs: Copies of the policies and procedures affecting the ECS, such as, site authority, resource management, fault recovery, testing, simulations, maintenance, logistics, performance evaluation, training, quality and product assurance, inventory management, system enhancements, finance management, administrative actions, and security.		

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Operations Supervisor: Confirm that the site receives system-level policies from the SMC. Verify that principal ECS operational functions at the site are provided for in the management and control of ESDIS/ECS policies and procedures.	
20	Operations Supervisor: Verify through inspection that the security management policies and procedures at the site includes password management, operational security, data classification, access privileges, system hardware and software maintenance, and spare parts inventory guidelines.	
30	Operations Supervisor: Confirms that the LSM uses methods and procedures appropriate for controlling policies and procedures as well as pertinent correspondence at the system-wide and site level, respectively.	
40	Operations Supervisor: Confirms that the policies and procedures are sufficiently expanded to provide a level of detail necessary for implementation at the site.	
50	Expected Results: Inspections and confirmations are successful. For specifics refer to DID611 and Zi014-00 Security Policy.	
60	Operations Supervisor: Verify through inspection that the ECS security policy covers the following areas, C2 level of security, communications, virus monitoring, protection controls, system restart/recovery, security audit trail generation, security analysis and reporting, and risk analysis.	
70	Expected Results: Inspection is successful. Specifics about compliance is demonstrated in DID 214/SE1.	
80	Operations Supervisor: Verify through inspection that the security section within all documents at the site are current with the ECS approved documentation.	
90	Expected Results: Inspection is successful.	
100	Operations Supervisor: Verify that backup copies of the policy and procedure manuals are maintained at a separate physical location at the site	
110	Expected Results: Verification is successful.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.7.2 Policies and Procedures Maintenance

TEST Procedure No.: A080480.020\$L	Date Executed:	Test Conductor:
Title: Policies and Procedures Maintenance		
Objective: To verify that the LSM provides a bulletin board service with information on ECS status, events, and news so that ESDIS, SMC, and LSM policies and procedures and directives can be properly maintained and distributed. It confirms that access to updating this information is limited to specified personnel with the proper ECS responsibility and authority.		
Requirements	Acceptance Criteria	
EOSD1990#A	<p>This requirement is verified through inspection. The interpretation criteria for this requirement is as determined in the technical security planning policy activity documented in EOSD2100, and is verified in the previous procedure (A080480.010).</p> <p>The ECS system and elements shall employ security measures and techniques for all applicable security disciplines which are identified in the preceding documents. These documents must provide the basis for the ECS security policy.</p> <p>The Operations Supervisor verifies through inspection that there are security measures and techniques for all applicable security disciplines.</p>	
EOSD2100#A	<p>This requirement is verified through inspection.</p> <p>The ECS technical security policy planning shall be comprehensive and shall cover at least the following areas:</p> <ul style="list-style-type: none"> a. Applicability of the C2 Level of Trustiness as defined by the NSA b. Applicability of the C2 Object Reuse capability c. Discretionary control and monitoring of user access d. ECS communications, network access, control, and monitoring e. Computer system "virus" monitoring, detection, and remedy f. Data protection controls g. Account/privilege management and user session tailoring h. Restart/recovery i. Security audit trail generation j. Security analysis and reporting k. Risk analysis <p>Verify through inspection that the security management policies and procedures at the site includes the ECS technical security policy planing.</p>	
EOSD2200#A	<p>This requirement is verified through inspection.</p> <p>Selection criteria meeting overall ECS security policies and system requirements shall be applied when selecting hardware.</p> <p>The Tester will verify that the overall ECS security policies and system requirements are applied when selecting hardware.</p>	

SMC-2605#A	<p>This requirement is verified through demonstration. Partial compliance is performed by the staff using various office automation, CM, and other tools.</p> <p>The LSM shall support the site and element in implementing ESDIS Project policies and procedures received from the SMC covering the following areas, at a minimum:</p> <ul style="list-style-type: none"> a. Element responsibility and authority b. Resource management c. Fault recovery d. Testing e. Simulation f. Maintenance g. Logistics h. Performance evaluation i. Training j. Quality and product assurance k. Inventory management l. System enhancements m. Finance management n. Administrative actions o. Security <p>The Operations Supervisor verifies through demonstration that the names for the policies, procedures, and directives for element responsibility and authority, resource management, fault recovery, testing, simulation, maintenance, logistics, training, inventory management, system enhancements, finance management, administrative actions, and security were received from the SMC.</p>
SMC-2610#A	<p>This requirement is verified through demonstration. Partial to support distribution of toolkits.</p> <p>The SMC shall provide and maintain a bulletin board service with information on ECS status, events, and news.</p> <p>The Operations Supervisor verifies through demonstration the capability of the LSM to provide, via the ECS bulletin board service, a toolkit consisting of a list of approved CASE tools and references to standards for exchanging data for science use.</p>
SMC-4305#A	<p>This requirement is verified through analysis. Compliance for this requirement is performed by using office automation tools.</p> <p>The LSM shall maintain fault management policies and procedures for its element.</p> <p>The Operations Supervisor verifies through analysis the capability of the system to find the policies, procedures, and directives for element responsibility and authority, resource management, fault recovery, testing, simulation, maintenance, logistics, training, inventory management, system enhancements, finance management, administrative actions, and security. Using the office automation tools, change a paragraph in the fault management directive and store the document back into the CM data base.</p>

SMC-5305#A	<p>This requirement is verified through analysis. In this release only partial compliance is performed using office automation tools.</p> <p>The LSM shall maintain security policies and procedures, including, at a minimum:</p> <ul style="list-style-type: none">a. Physical securityb. Password managementc. Operational securityd. Data classificationse. Access/privilegesf. Compromise mitigation <p>The Operations Supervisor verifies through analysis the capability of the system to find the policies, procedures, and directives for physical security, password management, operational security, data classifications, access/privileges, and compromise mitigation. Using the office automation tools, change a paragraph in a security policy and store the document back into the CM data base.</p>			
Test Inputs: Hardcopies of the ESDIS project policies and procedures which includes, element authority, resource management, fault recovery, testing, simulation, maintenance, logistics, performance evaluation, training, quality and product assurance, inventory management, system enhancements, finance management, administrative actions, and security.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Operations Supervisor: Login to the system.	
20	Expected Result: Successful logon.	
30	Operations Supervisor: Obtain proper ECS authority to update policies.	
40	Expected Result: The Tester has the responsibility and authority to access and update information in policies and procedures, and directives.	
50	Operations Supervisor: Enter the QA data base directory for read/write.	
60	Expected Result: Entry to the QA system.	
70	Operations Supervisor: Query the QA data base for on line policies and procedures, and directives.	
80	Expected Result: A listing of the current policies, procedures, and directives is displayed.	
90	Operations Supervisor: From the listing find the names for the policies, procedures, and directives for performance evaluation, and quality and product assurance.	
100	Operations Supervisor: Query the policy for performance evaluation and list the policy status.	
110	Operations Supervisor: Check known status with the computer generated policy status.	
120	Expected Result: The status information compares.	
130	Operations Supervisor: Using the office automation tools display the performance evaluation policy.	
140	Expected Result: The performance evaluation policy is displayed.	
150	Operations Supervisor: Using the office automation tools, change a paragraph in the policy and store the document back into the QA data base.	
160	Expected Result: The performance evaluation policy will be updated and flagged for down loading to the SMC to replace the document maintained in the SMC data base.	
170	Operations Supervisor: Close the QA data base.	
180	Operations Supervisor: Enter the CM data base directory for read/write.	
190	Expected Result: Entry to the CM system.	
200	Operations Supervisor: Query the CM data base for on line policies and procedures, and directives.	
210	Expected Result: A listing of the current policies, procedures, and directives is displayed.	

220	Operations Supervisor: From the listing find the names for the policies, procedures, and directives for element responsibility and authority, resource management, fault recovery, testing, simulation, maintenance, logistics, training, inventory management, system enhancements, finance management, administrative actions, and security	
230	Operations Supervisor: Query the policy for performance evaluation and list the directive status for training.	
240	Operations Supervisor: Check known status with the computer generated directive status.	
250	Expected Result: The status information compares.	
260	Operations Supervisor: Using the office automation tools display the training directive.	
270	Expected Result: The training directive is displayed.	
280	Operations Supervisor: Using the office automation tools, change a paragraph in the directive and store the document back into the CM data base.	
290	Expected Result: The training directive will be updated and flagged for down loading to the SMC to replace the document maintained in the SMC data base.	
300	Operations Supervisor: Close the CM data base.	
310	Operations Supervisor: Demonstrate the capability of the LSM to provide, via the ECS bulletin board service, a toolkit consisting of a list of approved CASE tools and references to standards for exchanging data for science use.	
320	Expected Result: Successful demonstration.	
330	Operations Supervisor: Log on to the bulletin board server.	
340	Expected Result: Bulletin board service is initialized.	
350	Operations Supervisor: Scroll down the bulletin board list for information on ECS status, events, and news.	
360	Operations Supervisor: Open the ECS status bulletin board.	
370	Expected Result: A list of the ECS status messages is displayed.	
380	Operations Supervisor: Select a message.	
390	Expected Result: The message is displayed.	
400	Operations Supervisor: Quit.	
410	Expected Result: Exit the bulletin board.	
Data Reduction and Analysis Steps: To assure that complete security policies and procedures applicable to LaRC are in-place and are maintained within the SMC complex the following is done: A. Written site policies and procedures are available. B. Inspect the security documentation for applicability to LaRC. The inspection also verifies that LaRC security documentation is maintained to include latest security directives		
Signature:		Date:

8.4.8 Network Management Sequence

This sequence confirms the ECS ability to support, control and maintain ECS network management information such as network configuration management, network fault management, network performance management, network security management at the LaRC DAAC. ECS network configuration management functions are inspected. Procedures for interoperability with the NSI to provide user access to the ECS are inspected.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & ISS. Refer to Appendix D for additional detail.

External Interfaces: There are no external interfaces needed for this sequence.

Operator Position(s): The operator position from the ECS Maintenance and Operations Position Descriptions document (607/OP3) needed to support this sequence is listed:

DAAC Resource Manager

Operational Scenario(s): The following scenarios, taken from Operations Scenarios for the ECS Project: Release-A (605/OP1), are used during this sequence of tests.

System Status Scenario (Section 3.14.3)

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.4.8.1 Network Configuration and Status

TEST Procedure No.: A080490.010\$L	Date Executed:	Test Conductor:
Title: Network Configuration and Status		
Objective: The Network Status Test confirms the ability of the LaRC LSM staff to obtain configuration management information and the status of network resources, including data flow status information. Services provided by ECS include collecting information describing the state of the network subsystem and its communications resources. This test also verifies the ability to perform management functions which exercise control over the network configuration, parameters, and resources. These functions include access to and manipulation of network resources.		
Requirements	Acceptance Criteria	
ASTER-1060#A	This requirement is verified through test. ECS shall provide support for Transport Control Protocol/Internet Protocol (TCP/IP) communications protocols to the U.S. Gateway for ASTER GDS communications. The Tester must perform TCP and IP communications tests provided by HP OpenView.	
EOSD0780#A	This requirement is verified through demonstration. Each element shall be capable of being monitored during testing. The Tester must obtain system status using HP OpenView.	

ESN-0620#A	<p>This requirement is verified through test.</p> <p>The ESN shall include a network management function to monitor and control the ESN.</p> <p>The Tester must verify that HP OpenView provides the ability to monitor and control the network.</p>
ESN-0640#A	<p>This requirement is verified through test.</p> <p>The ESN shall include management functions at each ECS element, equipment or gateway within the ESN.</p> <p>The MSS Discovery Service must discover (via network protocol) new instances of managed objects, detect missing occurrences of managed objects, and report missing occurrences of managed objects.</p>
ESN-0650#A	<p>This requirement is verified through test.</p> <p>The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility:</p> <ul style="list-style-type: none"> a. Network Configuration Management b. Network Fault Management c. Network Performance Management d. Network Security Management <p>The Tester must utilize HP OpenView to obtain information on the system configuration and changes in the system configuration. This test does NOT verify parts b, c and d of the requirement.</p>
ESN-0690#A	<p>This requirement is verified through test.</p> <p>The ESN shall be capable of reconfiguration transparent to network users.</p> <p>Needs further investigation. On ESDIS List.</p>
ESN-0750#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide statistical processing capabilities to allow extraction and tabulation of network performance data.</p> <p>The MSS performance management application service must log ECS performance data pertaining to ECS network components and operating system resources.</p>
ESN-0780#A	<p>This requirement is verified through test.</p> <p>The network elements including the Internet interfaces, shall have the capability to report, periodically and on an interactive basis, network statistics to the ESN network management function, including the following information:</p> <ul style="list-style-type: none"> a. Network round trip delay b. Network reset and restart indications c. Outages and CRC errors d. Performance statistics <p>The ISS physical components, and services must have the capability to be monitored via SNMP agents. This test does NOT verify part d of this requirement.</p>

ESN-0790#A	<p>This requirement is verified through test.</p> <p>The ESN shall include the following configuration management functions at a minimum:</p> <ul style="list-style-type: none"> a. collect information describing the state of the network subsystem and its communications resources, b. exercise control over the configuration, parameters, and resources of the subsystem, and over the information collected, c. store the configuration information collected, and d. display the configuration information <p>The MSS Maps/Collection Service must retain the status of managed objects and their relationship to symbols that comprise a graphical representation of the physical network topology. The MSS Fault Management Application Service must provide the capability to create, modify, delete and display graphical representations of a given network topology.</p>
ESN-0800#A	<p>This requirement is verified through test.</p> <p>The ESN shall be capable of displaying the local network configuration status related to each system locally, and for all systems at the ESN network management facility.</p> <p>The MSS must be capable of displaying the local network configuration status related to each system locally, and for all systems at the network management facility.</p>
ESN-1030#A	<p>This requirement is verified through demonstration.</p> <p>The ESN shall perform periodic testing of alternate communication capabilities to verify that they are operational.</p> <p>The Tester must demonstrate multiple tests of the communications system.</p>
ESN-1060#A	<p>This requirement is verified through test.</p> <p>The ESN performance management function shall provide the capability to evaluate the performance of ESN resources and interconnection activities.</p> <p>The MSS performance management application service must be capable of receiving operational state change notifications from network components, hosts, applications, and peripherals.</p>
ESN-1070#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide the capability to perform the following functions, at a minimum:</p> <ul style="list-style-type: none"> a. generate/collect network statistics b. control collection/generation of network statistics c. store system statistics and statistical histories d. display the system statistics e. track end-to-end transaction performance. <p>The Tester must generate, control, display and store system and network statistics. This test does NOT verify part e of this requirement.</p>
ESN-1140#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide protocol translation, termination, bridging and routing.</p> <p>The Tester performs IP, UDP, and SNMP protocol tests demonstration the ability to translate between multiple protocols. The Tester identifies bridges and routers using HP OpenView's configuration topology map.</p>

ESN-1330#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide ISO/OSI data communications protocols and services specified in the GOSIP (see Figure 8-3) to external interfaces as required by the IRDs.</p> <p>The CSS must support the TCP and UDP communication protocols to communicate between the servers and the clients. The GOSIP services are not required in Release A.</p>
ESN-1340#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide support for TCP/IP communications protocols and services to external interfaces as required by the IRDs.</p> <p>The MSS must support TCP/IP communications protocols and services to external interfaces as required by the IRDs. The GOSIP services are not required in Release A.</p>
NSI-0020#A	<p>This requirement is verified through test.</p> <p>NSI shall provide support for TCP/IP communication protocols and services to ESN.</p> <p>The NSI must support TCP/IP communications protocols and services to GSFC as required by the IRDs.</p>

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Resource Manager: Log on to DAAC MSS Server as an administrator	
20	Resource Manager: Execute the HP OpenView application.	
30	Expected Results: HP OpenView window is displayed on the screen. The HP OpenView window displays a map depicting the DAAC configuration.	
40	Resource Manager: Identify routers and gateways depicted in the map.	
50	Resource Manager: Initialize an application being monitored by HP OpenView.	
60	Expected Result: The application is initialized.	
70	Resource Manager: Verify that the system recognizes the monitoring of the application.	
80	Expected Result: The system recognizes the monitoring of the application.	
90	Resource Manager: Exit from the application and verify that the system depicts the change.	
100	Expected Result: The change is depicted by the system.	
110	Resource Manager: Make HP OpenView's window active by clicking on it.	
120	Expected Result: HP OpenView's window is active.	
130	Resource Manager: Perform an IP protocol test.	
140	Expected Result: HP OpenView verifies the use of IP protocol communications.	
160	Resource Manager: Perform a TCP protocol test.	
170	Expected Result: HP OpenView verifies the use of TCP protocol communications.	
180	Resource Manager: Perform an UDP protocol test.	
190	Expected Result: HP OpenView verifies the use of UDP protocol communications.	
200	Resource Manager: Perform an SNMP protocol test.	
210	Expected Result: HP OpenView verifies the use of SNMP protocol communications.	
220	Resource Manager: Connect a hardware device to the network (e.g. a printer). Verify that the system recognizes the new configuration.	
230	Expected Result: The topology map displayed by HP OpenView depicts the new configuration.	
240	Resource Manager: Turn off the power to the hardware device. Verify that the system recognized the new configuration.	
250	Expected Result: The topology map displayed by HP OpenView depicts the new configuration.	

260	Resource Manager: Turn the power back on for the hardware device. Verify that the system recognized the new configuration.	
270	Expected Result: The topology map displayed by HP OpenView depicts the new configuration.	
280	Resource Manager: Disconnect the hardware device from the network. Verify that the system recognizes the new configuration.	
290	Expected Result: The topology map displayed by HP OpenView depicts the new configuration.	
300	Resource Manager: Change to the directory which contains the history log.	
310	Resource Manager: Examine the history log to determine whether the events have been documented.	
320	Expected Results: The events have been documented in the history log.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.4.8.2 Directory Service

TEST Procedure No.: A080490.050\$L	Date Executed:	Test Conductor:
Title: Directory Service		
Objective: The purpose of this test is to investigate the functionality of the Directory/Naming Service. The Directory/Naming Service uniquely associates a name with resources/principals, either physical or logical, along with some information so they can be identified and located by the name even if the named resource changes its physical address over time.		
Requirements	Acceptance Criteria	
ESN-0010#A	<p>This requirement is verified through test.</p> <p>ESN shall provide the following standard services:</p> <ul style="list-style-type: none"> a. Data Transfer and Management Services b. Electronic Messaging Service c. Remote Terminal Service d. Process to Process Communication Service e. Directory and User Access Control Service f. Network Management Service g. Network Security and Access Control Service h. Internetwork Interface Services i. Bulletin Board Service <p>The Tester verifies the directory and user access control service by defining an attribute using the Directory/Naming Service.</p> <p>This test does NOT verify parts a, b, c, d, f, g, h, and i of the requirement.</p>	
ESN-0490#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide a name-to-attribute mapping Directory Service.</p> <p>The Tester verifies the name-to-attribute mapping by defining an attribute using the Directory/Naming Service.</p>	

ESN-0510#A	<p>This requirement is verified through test.</p> <p>The directory function shall be able to respond to requests for information concerning named objects, either physical or logical, so as to support communications with those objects.</p> <p>The Tester verifies the directory function by modifying an attribute definition using the Directory/Naming Service.</p>			
ESN-0590#A	<p>This requirement is verified through test.</p> <p>The ESN Directory Service shall be protected by access control capabilities.</p> <p>The CSS Security service must provide an API to verify the identity of users.</p>			
ESN-0600#A	<p>This requirement is verified through test.</p> <p>The ESN Directory service shall include services and supporting mechanisms to authenticate the credentials of a user for the purpose of granting access rights and authorizing requested operations.</p> <p>The CSS Security service must provide an API to check the authorization privileges of principals to access/control services/resources.</p>			
ESN-0610#A	<p>This requirement is verified through test.</p> <p>The ESN shall include multiple Directory Service Agents (DSAs) which are collectively responsible for holding or retrieving all directory information which is needed by ECS.</p> <p>The Tester verifies the directory and user access control service by defining an attribute using the Directory/Naming Service.</p>			
Test Inputs: Valid User Account and Passwords with access privileges to the V0 Client. Valid User Account and Passwords without access privileges to the V0 Client.				
Data Set Name	Data Set ID	File Name	Description	Version
Query Information for Directory Search			Valid Lists: Campaign/Project, Source/Platform, Sensor, Parameters, Processing Level, Dataset ID, Data Center ID, Geographic Area	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC User Assistant: Login to workstation using a valid user account and password. The user account does not have access rights to the V0 Client.	
20	Expected Results: ECS Desktop displays on the screen.	
30	DAAC User Assistant: Access the V0 Client.	
40	Expected Result: The IMS dialog box displays status of system coming up. The IMS dialog box notifies the user that the account does not have access privileges to the V0 Client.	
50	DAAC User Assistant: Logs off	
60	DAAC User Assistant: Login to workstation using a valid user account and password. The user account do have access rights to the V0 Client.	
70	Expected Result: ECS Desktop displays on the screen.	
80	DAAC User Assistant: Access the V0 Client.	
90	Expected Result: The IMS dialog box displays status of system coming up. Once up, dialog box disappears. The IMS Welcome screen is displayed.	
100	DAAC User Assistant: Performs multiple directory searches.	
110	Expected Result: The selected document information is displayed..	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.5 Performance Management Scenario

This scenario walks LaRC operations personnel through the process of accessing and displaying system performance parameters and metrics. It carries the staff through a series of analytical and diagnostic sequences which demonstrate the system's capability to measure LaRC performance and detect operational trends.

The Performance Management Scenario's acceptance testing activity confirms those functions that provide global integrated ECS performance management services and exercise system-wide control. Verifying ECS metrics confirms ECS capability for defining meaningful measures, for developing and maintaining standard performance metrics, and for accomplishing system-level performance testing and performance improvement actions.

8.5.1 Metrics Sequence

This test sequence verifies the capability of the LaRC LSM to interact with the SMC to evaluate system performance for a broad spectrum of activities including data collection and delivery, product generation, responses to user requests, and emergencies. LSM capabilities, including the ability to implement SMC performance criteria and limits testing, using SMC data base metrics for comparison, are confirmed. The SMC and the LSM capabilities to generate alert indicators for fault and degraded conditions are also confirmed.

Finally, the capability of the LaRC DAAC to provide the required availability of key services and to switch over or repair failed capabilities within specified mean down times (MDTs) is confirmed. ECS must have the capability to correct faults and to restore system capabilities within specified times. LaRC 420-05-03, Performance Assurance Requirements for the EOSDIS is the primary RMA Program Plan and , MIL-HDBK-217F, Reliability Prediction of Electronic Equipment, and MIL-HDBK-472, Maintainability Prediction, Procedure IV, provide guidelines in verifying ECS RMA. Table 8-1 summarizes key availability and maximum Mean Down Time (MDT) requirements for specific ECS services. A combination of inspection and analysis, demonstration and test is used.

Table 8-1. RMA Capabilities

ECS Segment	ECS Function or Service Provided	Minimum Availability/Maximum MDT
Overall	System-level Functions and Services	0.96/ 4 hr's.
SDPS	Receiving Science Data	0.999/ 2 hr's.
SDPS	Archiving and Distributing Data	0.98/ 2 hr's.
SDPS	User Interfaces to Information Management System (IMS) Services at DAAC Sites	0.993/ 2 hr's.
SDPS	Information Searches on the ECS Directory	0.993/ 2 hr's.
SDPS	Metadata Ingest and Update	0.96/ 4 hr's.
SDPS	Information Searches on Local Holdings	0.96/ 4 hr's.
SDPS	Local Data Order Submission	0.96/ 4 hr's.
SDPS	Data Order Submission Across DAACs	0.96/ 4 hr's.
SDPS	IMS Data Base Management and Maintenance Interface	0.96/ 4 hr's.
SDPS	Product Generation Capability (Each Computer)	0.95/ N/A
CSMS	SMC Capability to Gather and Disseminate System Management Information (for critical services)	0.998/ 20 min.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, & ISS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Production Planner

DAAC Production Monitor

DAAC Resource Manager

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that were used to develop tests in this sequence of tests are listed:

User Notes Performance Degradation (Section 3.5.2)

Operation Support Scenario (Section 3.5.1)

Test Dependencies: The following table identifies the test procedure(s) for this sequence of test that should be run prior to or concurrently with this test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080510.010\$L	A080510.010\$S	Concurrent
A080510.030\$L	A080510.020\$L	Concurrent

8.5.1.1 Performance Metrics Establishment

TEST Procedure No.: A080510.010\$L		Date Executed:		Test Conductor:	
Title: Performance Metrics Establishment					
Objective: This test case verifies the capability of the SMC and the local site LSMs to establish, maintain and update system performance criteria and performance parameter limits and thresholds. The capability to establish multiple threshold levels, including on/off, pass/fail, and various levels of degradation, is also confirmed.					
Requirements		Acceptance Criteria			
ESN-1090#A		This requirement is verified through test. The ESN shall provide the capability to control the communications performance parameters of the network. On ESDIS List.			
SMC-3355#A		This requirement is verified through analysis. The LSM shall implement the performance criteria from SMC (including parametric limits and operational threshold levels) for evaluating element resource performance During this test, LSM capabilities to set thresholds sent by the SMC will be verified by bringing up the appropriate tools and setting selected thresholds.			
SMC-3375#A		This requirement is verified through test. For each limit checked parameter, the LSM (including those thresholds directed by the SMC) shall have the capability of evaluating multiple levels of thresholds including, at a minimum: a. On/off b. Pass/fail c. Various levels of degradation During this test, LSM capabilities to set thresholds sent by the SMC will be verified by bringing up the appropriate tools and setting each of the thresholds.			
SMC-3385#A		This requirement is verified through test. (RTM:analysis) The LSM shall evaluate system performance against the ESDIS project established performance criteria. During this test, LSM capabilities to monitor system performance against ESDIS project performance criteria sent via the SMC will be verified by bringing up performance monitoring tools and demonstrating that these tools are capable of monitoring the specified performance parameters.			
Test Inputs: Required test case inputs include a list of ESDIS-specified performance parameters, specifications, and policies and procedures, as well as an operational script exercising different levels of performance to assess the capability to update and check limit and threshold parameters.					
Data Set Name	Data Set ID	File Name	Description	Version	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Starts HP OpenView.	
20	Expected Result: OpenView window displays top level system map.	
30	Tester: Selects an MSS managed host and set two thresholds for CPU utilization, one to indicate degraded performance and the other to indicate failure.	
40	Expected Result: The new CPU utilization threshold values can be observed by examining the Management Information Base (MIB) ???	
50	Tester: Starts a script to cause the CPU utilization to exceed the threshold for degraded performance but not to exceed the upper (failure) limit.	
60	Expected Result: The MSS managed host is running in a degraded state due to heavy CPU utilization.	
70	Tester: Clicks on CPU LOAD option from HP OpenView for MSS managed host.	
80	Expected Result: HP OpenView displays a CPU LOAD Graph containing the average CPU load on that host.	
90	Tester: Clicks on TIME INTERVAL option from HP OpenView menu for that host and scrolls back to the time period when the lower CPU utilization threshold is exceeded but not the upper limit.	
100	Expected Result: HP OpenView displays a CPU LOAD Graph containing the raised CPU load level .	
	PASS/FAIL	
110	Tester: Starts a script to cause the upper limit threshold to be exceeded.	
120	Expected Result: System is running MSS managed host exceeding its upper (failure) limit CPU utilization threshold thus causing a failure on the MSS managed host.	
130	Tester: Clicks on CPU LOAD option from HP OpenView for MSS managed host.	
140	Expected Result: HP OpenView displays a CPU LOAD Graph containing the average CPU load on that host.	
150	Tester: Clicks on TIME INTERVAL option from HP OpenView menu for that host and scrolls back to the time period that the upper limit CPU utilization threshold is exceeded.	
160	Expected Result: HP OpenView displays a CPU LOAD Graph containing the upper level of CPU load exceeded the currently configured CPU threshold thus causing the MSS managed host to fail. The HP OpenView icon for the MSS managed host is in red.	
	MEMORY UTILIZATION	
170	Tester: Repeats steps 10 - 160 using the Memory utilization performance parameter.	

180	Expected Result: As indicated in steps 10 - 160 but memory utilization now exceeds thresholds for degraded performance and later for failure.	
	THRESHOLDS DIRECTED BY THE SMC	
190	Tester: Repeats steps 10 - 160 using SMC to set thresholds.	
Data Reduction and Analysis Steps: Expected results include the verification of the capability of the SMC and the site LSMs to establish, maintain and update system performance parameters and limit thresholds. The capability to monitor performance and to evaluate performance and any degradation with respect to these parameters will be confirmed.		
Signature:		Date:

8.5.1.2 Performance Measurement and Degradation Response Capability

TEST Procedure No.: A080510.020\$L		Date Executed:		Test Conductor:	
Title: Performance Measurement and Degradation Response Capability					
Objective: This test case verifies the capability of the SMC to assess overall ECS performance, including performance during data collection, archiving, and delivery, data reprocessing requests, user requests, and system emergencies. The SMC and site LSM capabilities to generate alert indicators for fault or degraded conditions and to generate corrective actions in response to these faults or degradations are also confirmed.					
Requirements		Acceptance Criteria			
SMC-3395#A		This requirement is verified through test. The LSM shall generate, in response to each limit check threshold, alert indicators of fault or degraded conditions. During the test, conditions will be created to trigger alert indicators for each limit checked threshold. The requirement will be verified after the selected limit checked thresholds have been exceeded and appropriate alerts generated.			
Test Inputs: Required test case inputs include performance parameters and specifications, and an operational script for exercising and simulating faults and degraded performance conditions. ESDIS policies and procedures specifying the range of responses and corrective actions to faults and performance degradation are also needed.					
Data Set Name	Data Set ID	File Name	Description	Version	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Starts a production run of a PGE process on DMGHW-GSFC-2 that uses excessive disk space and causes the free space on DMGHW-GSFC-2 to fall below the threshold.	
20	Expected Result: A warning message indicating that free disk space on DMGHW-GSFC-2 has fallen below the threshold is displayed on the SMC operator's screen.	
30	Tester: Double clicks on the GSFC icon on HP OpenView .	
40	Expected Result: HP OpenView displays GSFC submap.	
50	Tester: Clicks on DMGHW-GSFC-2 icon.	
60	Expected Result: HP OpenView highlights the icon.	
70	Tester: Selects the Browse MIB option to determine the problem.	
80	Expected Result: HP OpenView shows information on various MIB parameters, including degraded state of disk free space.	
90	Tester: Graphs available disk free space data.	
100	Expected Result: HP OpenView graph capability shows that there has been excessive disk utilization since the process of Step 10 was started.	
110	Tester: Terminate the process started in Step 10.	
120	Expected Result: The PGE process is terminated.	
130	Tester: Saves the associated disk file to temporary storage.	
140	Expected Result: The disk file is backed up.	
150	Tester: Deletes the associated disk file.	
160	Expected Result: The disk file is deleted.	
170	Tester: Clicks on HP OpenView Browse MIB option.	
180	Expected Result: HP OpenView shows that DMGHW-GSFC-2 disk free space is no longer in a degraded state.	
190	Tester: Clicks on the HP OpenView Update (?) MIB option.	
200	Expected Result: HP OpenView displays current values for MIB parameters.	
210	Tester: For Data Collection activity, updates performance criteria for response time, updates deficiency response to change color of the icon for the node responsible for the activity. ???	
220	Expected Result: Inspection of the MIB shows that the information has been updated.	
230	Tester: Starts Data Collection activity.	
240	Expected Result: When the specified response time is exceeded, the specified icon will change color.	

250	Tester: Repeats steps 200 -240, goes through each of the remaining parameters indicated on the MIB.	
260	Expected Result: As indicated in steps 200 - 240.	
Data Reduction and Analysis Steps: Expected results include the verification of the capability of the SMC and the site LSMs to monitor performance and to generate corrective actions for performance degradation and system faults.		
Signature:		Date:

8.5.1.3 RMA Assurance Test and Analysis

TEST Procedure No.: A080510.030\$L	Date Executed:	Test Conductor:
Title: RMA Assurance Test and Analysis		
Objective: This test case verifies the capability of the ECS to provide services with required reliability, maintainability and availability (RMA). Table 8-1 summarizes key availability and maximum Mean Down Time (MDT) requirements for specific ECS services verified by this test case.		
Requirements	Acceptance Criteria	
EOSD3490#A	<p>This requirement is verified through inspection. (RTM: demo)</p> <p>Reliability statistics for ECS shall be collected and monitored using the Mean Time Between Maintenance (MTBM) for each component and operational capability.</p> <p>This capability is demonstrated by inspection of the MTBM Predictions used in, and analysis results documented in the DID #515. The inspection of process and procedures to collect and analyze RMA data during system operations after RRR will verify that Mean Time Between Maintenance MTBM will be collected and monitored.</p>	
EOSD3492#A	<p>This requirement is verified through inspection.</p> <p>RMA data shall be maintained in a repository accessible for logistics analysis and other purposes.</p> <p>This capability is demonstrated by inspection of the RMA database documented in the approved DIDs #516 and #518.</p>	
EOSD3500#A	<p>This requirement is verified through inspection.</p> <p>The ECS RMA Program shall adhere to GSFC 420-05-03, Performance Assurance Requirements for the EOSDIS.</p> <p>This capability is demonstrated by inspection of RMA Program Plan which is Section 7.0 of the approved Performance Assurance Implementation Plan DID #501.</p>	
EOSD3510#A	<p>This requirement is verified through inspection.</p> <p>Reliability predictions shall be calculated in accordance with the parts count analysis method, Appendix A, of MIL-HDBK-217F, Reliability Prediction of Electronic Equipment.</p> <p>This capability is demonstrated by inspection of the prediction process and Reliability prediction values in the approved DID #516.</p>	
EOSD3600#A	<p>This requirement is verified through inspection.</p> <p>Maintainability shall be predicted in accordance with MIL-HDBK-472, Maintainability Prediction, Procedure IV.</p> <p>This capability is demonstrated by inspection of the prediction process and Maintainability prediction values in the approved DID #518.</p>	

EOSD3620#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>ECS shall predict and periodically assess maintainability by measuring the actual MDT and comparing to the required MDT.</p> <p>The prediction requirement is demonstrated by inspection of the process and prediction values in the approved DID #515 and #518.</p> <p>The assessment requirement of the actual MDT is demonstrated by inspection of the process and procedures to collect and analyze RMA data during system operations after RRR .</p>
EOSD3625#A	<p>This requirement is verified through inspection.</p> <p>For ECS functions with a backup capability, ECS shall use switchover time to the backup capability in measuring maintainability, rather than down time, when the component goes down.</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3630#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The maximum down time shall not exceed twice the required MDT in 99 percent of failure occurrences.</p> <p>This requirement will be demonstrated by inspection of the actual MDT data when the system has been in operation for a statistically significant length of time. (Note: This requirement is not verifiable until the system has been in operation for a statistically significant length of time.)</p> <p>This requirement is not verifiable until the system has been in operation for a statistically significant length of time.</p>
EOSD3700#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>ECS functions shall have an operational availability of 0.96 at a minimum (.998 design goal) and an MDT of four (4) hours or less (1.5 hour design goal), unless otherwise specified. The above requirement covers equipment including:</p> <ol style="list-style-type: none"> "Non-critical" equipment configured with the critical equipment supporting the functional capabilities in the requirements. Equipment providing other functionality not explicitly stated in the RMA requirements that follow. <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3900#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of receiving science data shall have an operational availability of 0.999 at a minimum (.99995 design goal) and an MDT of two (2) hours or less (8 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3910#A	<p>This requirement is verified through test.</p> <p>The switchover time from the primary science data receipt capability to a backup capability shall be 15 minutes or less (10 minutes design goal).</p> <p>This requirement is demonstrated by the Maintainability Demonstration Test defined in DIDs #511 and #512 and documented in the Report DID 519.</p>
EOSD3920#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of archiving and distributing data shall have an operational availability of 0.98 at a minimum (.999999 design goal) and an MDT of two (2) hours or less (9 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>

EOSD3930#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The user interfaces to Information Management System (IMS) services at individual Distributed Active Archive Center (DAAC) sites shall have an operational availability of 0.993 at a minimum (.9997 design goal) and an MDT of two (2) hours or less (1.6 hour design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3940#A	<p>This requirement is verified through inspection. (RTM: blank)</p> <p>The SDPS function of Information Searches on the ECS Directory shall have an operational availability of 0.993 at a minimum (.9997 design goal) and an MDT of two (2) hours or less (1.4 hour design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3960#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of Metadata Ingest and Update shall have an operational availability of 0.96 at a minimum (.999999 design goal) and an MDT of four (4) hours or less (6 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3970#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of Information Searches on Local Holdings shall have an operational availability of 0.96 at a minimum (.999999 design goal) and an MDT of four (4) hours or less (6 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3980#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of Local Data Order Submission shall have an operational availability of 0.96 at a minimum (.999999 design goal) and an MDT of four (4) hours or less (6 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD3990#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of Data Order Submission Across DAACs shall have an operational availability of 0.96 at a minimum (.999999 design goal) and an MDT of four (4) hours or less (6 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD4000#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>The SDPS function of IMS Data Base Management and Maintenance Interface shall have an operational availability of 0.96 at a minimum (.999999 design goal) and an MDT of four (4) hours or less (6 minutes design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>
EOSD4010#A	<p>This requirement is verified through inspection. (RTM: analysis)</p> <p>Each computer providing product generation shall have an operational availability of 0.95 at a minimum (.9995 design goal).</p> <p>This requirement is demonstrated by inspection of the approved DID #515.</p>

EOSD4100#A		<p>This requirement is verified through test. (RTM: Demo)</p> <p>The ECS segments, elements, and components shall include the on-line (operational mode) and off-line (test mode) fault detection and isolation capabilities required to achieve the specified operational availability requirements.</p> <p>This requirement is demonstrated by the Maintainability Demonstration Test defined in DIDs #511 and #512 and documented in the Report DID 519..</p>		
Test Inputs: Test case inputs include reliability data and repair specifications for key ECS components, switch over time estimations, in-the-field maintenance records, and demonstrations by operations staff of repair and switch over procedures for various failure occurrences.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Inspects DID #515 to verify the following requirements: EOSD3490#A, EOSD3625#A, EOSD3700#A, EOSD3900#A, EOSD3920#A, EOSD3930#A, EOSD3940#A, EOSD3960#A, EOSD3970#A, EOSD3980#A, EOSD3990#A, EOSD4000#A, EOSD4010#A, EOSD4030#A.	
20	Expected Result: The expected result for each requirement is as stated in the acceptance criteria for each respective requirement.	
30	Tester: Inspects DID #516 for the following requirements: EOSD3492#A, EOSD3510#A.	
40	Expected Result: The expected result for each requirement is as stated in the acceptance criteria for each respective requirement.	
50	Tester: Inspects DID #518 for the following requirements: EOSD3492#A, EOSD3600#A, EOSD3620#A.	
60	Expected Result: The expected result for each requirement is as stated in the acceptance criteria for each respective requirement.	
70	Tester: Inspects DID #501 for the following requirements: EOSD3500#A.	
80	Expected Result: The expected result for each requirement is as stated in the acceptance criteria for each respective requirement.	
90	Tester: Examines the test executed in Maintainability Demo Test, DID #511 and DID #512 to verify that the switchover time from the primary science data receipt capability to a backup capability will take 15 minutes or less.	
100	Expected Result: DID #519 (Test Report) states that the result of the test stated in DID #511 and DID #512 indicating that the switchover from the primary science data receipt capability to a backup capability takes 15 minutes or less.	
110	Tester: Examines the test executed in Maintainability Demo Test, DID #511 and DID #512 to verify that the ECS system includes the on-line (operational mode) and off-line (test mode) fault detection and isolation capabilities required to achieve the specified operational availability.	
120	Expected Result: DID #519 (Test Report) states that the result of the test stated in DID #511 and DID #512 indicating the ECS system includes the on-line (operational mode) and off-line (test mode) fault detection and isolation capabilities required to achieve the specified operational availability.	

Data Reduction and Analysis Steps:

Expected results include inspecting the related Maintainability Demo Test documents to confirm that the ECS can make needed services available as required and can repair or switch over from failed capabilities.

Signature:**Date:****8.5.2 Performance Monitoring, Analysis & Testing Sequence**

This sequence guides the reviewer in confirming each LSM's capability to generate, as needed, requests for performance testing including resources to be tested, test purpose, requested test environment, impacts to operations and expected results. This evaluation includes confirmation and review of the performance test tool and evaluation of LSM personnel resources to determine the ability of the system and site test teams to respond to specific testing requests.

This test sequence guides the reviewer in inspecting site capability for performing, analyzing and reporting on short and long term performance trend analyses of site operational status, specific resource performance and maintenance activities. The LSM's performance management team procedures for monitoring site hardware and software to determine their operational states (on-line, failed, in maintenance mode, test mode, or simulation mode) are inspected.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, & ISS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

EBnet

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document needed to support this sequence are listed:

DAAC Production Planner

DAAC Resource Manager

Operational Scenario(s): The operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A document, that were used to develop tests in this sequence of tests are listed:

Resource Planning (Section 3.7.1)

User Notes Performance Degradation (Section 3.5.2)

Performance Trending Scenario (Section 3.5.4)

Preparing for New Algorithm Scenario (Section 3.5.3)

Test Dependencies: The following table identifies the test procedure(s) for this sequence of test that should be run prior to or concurrently with this test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080520.010\$L	SMC/A080520.010\$S	Concurrent
A080530.010\$L	LaRC/A080520.010\$L	Concurrent

8.5.2.1 Performance Testing

TEST Procedure No.: A080520.010\$L	Date Executed:	Test Conductor:
Title: Performance Testing		
Objective: This test case verifies that the LSM has the capability to generate and coordinate requests for performance testing. It also evaluates the LSM's ability to respond to testing requests. The AT team observes the actions of the M&O team and compares them with procedures, noting any deficiencies and discrepancies.		
Requirements	Acceptance Criteria	
EOSD0560#A	This requirement is verified through demonstration. (RTM: test) ECS benchmark tests and test data sets shall be defined for system verification and data quality evaluation. The benchmark tests and test data sets provided by a representative ECS element (e.g., a Data Server subsystem) will run to completion and generate reports.	
EOSD0700#A	This requirement is verified through demonstration. Each ECS element shall provide the following, to be used in the revalidation of its functional performance: a. Benchmark test(s) b. Standard test data sets. A representative ECS element's (e.g., a Data Server subsystem) benchmark tests used to revalidate its functional performance will be run to completion.	
EOSD0720#A	This requirement is verified through demonstration. Each ECS element shall be able to validate at any time during the life-time of the ECS that the ECS element primary functional performance is consistent with pre-defined operational benchmark tests. A representative ECS element's (e.g., a Data Server subsystem) benchmark tests will be run to completion.	

SMC-3397#A	<p>This requirement is verified through demonstration. (RTM: test).</p> <p>The LSM shall generate, as needed, requests for performance testing, including, at a minimum:</p> <ul style="list-style-type: none">a. Resource to be testedb. Test purposec. Requested test priorityd. Required test environmente. Impacts to operationsf. Expected test results <p>Performance tools will be used by an operations staff to request performance testing which includes the following information:</p> <ul style="list-style-type: none">a. Resource to be testedb. Test purposec. Requested test priorityd. Required test environmente. Impacts to operationsf. Expected test results			
Test Inputs: Benchmark tests provided by the software development group and the M&O procedure for requesting performance test will be needed.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
5	Tester: Follows M&O's to be developed procedure for requesting performance test (in this case, benchmark test).	
7	Expected Result: Performance test request procedure executed.	
10	Tester: Starts Resource Planning tool.	
20	Expected Result: Resource Planning window appears on the screen.	
30	Tester: Clicks Edit push-button on the Resource Planning window.	
40	Expected Result: Resource Request form appears in the window.	
50	Tester: Enters a request to run a benchmark test on LaRC DAAC host, including start and end times, resources, brief description including test purpose and priority, comments including required environment, impacts to operations, and expected test results. Then clicks "Accept".	
60	Expected Result: The request is entered into the resource planning database.	
90	Tester: Clicks Review push-button on the Resource Planning window.	
100	Expected Result: A list of resource requests appears on the screen.	
110	Tester: Double clicks on the request entered by the tester.	
120	Expected Result: The complete request as previously entered by the tester appears on the screen.	
130	Tester: Inspects the request for validity. Clicks on the Validate and Approve push-buttons on the screen.	
140	Expected Result: The resource request includes the "Validated" and "Approved" indicators.	
150	Tester: Clicks on the Accept push-button.	
160	Expected Result: The resource planning database is successfully updated.	
170	Tester: Initiates the LaRC DAAC performance benchmark test.	
180	Expected Result: The LaRC DAAC performance benchmark test runs to completion, storing a summary of results in the performance management database and printing a summary of the results.	

Data Reduction and Analysis Steps:

The history log and performance management database is analyzed and the performance benchmark test should include:

- a. Resource to be tested
- b. Test purpose
- c. Requested test priority
- d. Required test environment
- e. Impacts to operations
- f. Expected test results

Signature:**Date:****8.5.2.2 Performance Monitoring and Analysis**

TEST Procedure No.: A080530.010\$L	Date Executed:	Test Conductor:
Title: Performance Monitoring and Analysis		
Objective: The test objectives are to observe and acquire trend information reflecting push and pull transaction rates along with associated trends reflecting delays associated with completion of those transactions. Visualization capabilities that enable SMC and LSM operations personnel to determine the state for each principal node of the ECS network and the LAN, respectively, are confirmed.		
Requirements	Acceptance Criteria	
DADS1340#A	This requirement is verified through demonstration. (RTM: test.) Each DADS shall use tools to analyze system performance. Tools such as HP OpenView, Spreadsheet application, Resource Planning will be used throughout the test to demonstrate that tools are used to analyze system performance.	
DADS1360#A	This requirement is verified through test. Each DADS shall monitor the status of all storage systems used. The status of storage systems will be monitored by querying the management database.	
DADS1620#A	This requirement is verified through demonstration. At each DADS tools shall be available for operations/systems/maintenance personnel to monitor performance. Tools such as HP OpenView, Spreadsheet application, Resource Planning will be used throughout the test to demonstrate that tools are used to monitor performance.	
ESN-1060#A	This requirement is verified through test. The ESN performance management function shall provide the capability to evaluate the performance of ESN resources and interconnection activities. On ESDIS List.	

ESN-1065#A	<p>This requirement is verified through analysis.</p> <p>The ESN performance management function shall include trend analysis for prediction of loading and bottlenecks/delays.</p> <p>The trend analysis on ESN performance management function will include the prediction of loading and bottlenecks/delays.</p> <p>On ESDIS List.</p>
NI-0460#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to receive periodic information regarding EBnet network performance and link utilization.</p> <p>The EBnet network performance and link utilization will be sent to ECS periodically and will be monitored by querying the management database and included in a performance report.</p>
NSI-0060#A	<p>This requirement is verified through test. (RTM: blank)</p> <p>NSI shall provide ECS SMC with load analysis reports, reflecting or summarizing NSI performance measurements over various time intervals.</p> <p>SMC will receive the load analysis reports from NSI and a trend analysis with various time intervals will be performed based on the NSI's load reports.</p>
SMC-3305#A	<p>This requirement is verified through test.</p> <p>The LSM shall monitor its elements hardware, and scientific and system software status to determine their operational states including, at a minimum :</p> <ul style="list-style-type: none"> a. On-line b. Failed c. In maintenance d. In test mode e. In simulation mode <p>The operational states (i.e., on-line, failed, in maintenance, in test mode and in simulation mode) of GSFC DAAC hardware, scientific and system software will be indicated via HP Open View.</p>
SMC-3315#A	<p>This requirement is verified through demonstration.</p> <p>The LSM shall monitor its elements schedule and execution of events.</p> <p>LSM will check the status of an executed task which is planned via the resource planning tool.</p>
SMC-3325#A	<p>This requirement is verified through demonstration.</p> <p>The LSM shall monitor execution of ground operations events.</p> <p>The performance data resulting from one of the ground operation events (i.e., performance testing: A080520.010\$G, SMC-3397#A) will be collected and analyzed.</p>
SMC-3335#A	<p>This requirement is verified through test.</p> <p>The LSM shall compare and evaluate its elements actual schedule performance against planned schedule performance.</p> <p>A set of tasks will be executed and reports generated by LSM and the actual schedule performances will be manually compared against those of planned schedule performances.</p>

SMC-3415#A	<p>This requirement is verified through test.</p> <p>The LSM shall perform short and long-term trend analysis of element performance, including, at a minimum:</p> <ul style="list-style-type: none">a. Operational statusb. Performance of a particular resourcec. Maintenance activities (e.g., number of repairs per item) <p>Graphical Performance trend analysis reports on operational status, performance and maintenance activities for a particular device (e.g., archive storage device) will be obtained and analyzed.</p>			
Test Inputs: A script that performs a query of the management database will be needed.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Tester: Initializes HP OpenView.	
20	Expected Result: The HP OpenView window appears displaying the root map for the system.	
30	Tester: Follow procedure(???) to place computer running Science Data Server (SDS) in maintenance mode.	
40	Expected Result: The SDS host is now in maintenance mode.	
50	Tester: Uses the "Locate" function on the HP OpenView menu to bring up the map containing the SDS managed host.	
60	Expected Result: The map containing the SDS managed host appears on the screen. The host icon indicates that the host is in maintenance mode.	
70	Tester: Places the host running the SDS online.	
80	Expected Result: The host icon is green indicating that the host is up and functioning.	
90	Tester: Induces a failure in a tape drive. (Attempt to write to a write protected tape cartridge.)	
100	Expected Result: Failure status for the tape drive appears.	
110	Tester: Clicks on the icon for the host to which the tape drive is connected.	
120	Expected Result: The icon is highlighted.	
130	Tester: Requests to view status of host hardware.	
140	Expected Result: The status display indicates failure status for the tape drive.	
150	Tester: Run a script that performs a query of the management database for status and performance information on storage systems, network utilization, ground operation events (e.g., performance testing) etc. The script will create a report from the data.	
160	Expected Result: A report containing the desired status and performance information is printed. It is saved for post test analysis.	
210	Tester: Starts up the spreadsheet application.	
220	Expected Result: The spreadsheet is up and running.	
230	Tester: Imports the monthly network performance data into the spreadsheet.	
240	Expected Result: The network performance data from the management database appear in the spreadsheet cells.	
250	Tester: Creates spreadsheet tables (using the spreadsheet package) containing the network performance data.	
260	expected Result: The spreadsheet tables containing the network performance data are created.	

270	Tester: Enters spreadsheet command to create weekly trend predictions for the next six months for the network performance values using statistical trending functions provided in the spreadsheet application.	
280	Expected Result: The spreadsheet application calculates future values for the performance metrics using statistical trending functions provided as part of the spreadsheet package.	
290	Tester: Enters spreadsheet commands to create graphical representations of the trend predictions created in the previous step .	
300	Expected Result: The spreadsheet application creates a line graph depicting both the actual data stored in the management database and the future values predicted by the spreadsheet for each of the network performance metrics.	
310	Tester: Change the time interval to be used in trend analysis to get the short term trend analysis.	
320	Expected Result: The graphs will be automatically updated to reflect the change in data.	
330	Tester: At the conclusion of the performance test (A080520.010\$), enter HP OpenView command to view system performance data from the test.	
340	Expected Result: The performance data are displayed on the screen.	
350	Tester: Retrieves from the management database performance data from a previous run of the same data.	
360	Expected Result: The previous performance test data are displayed on the screen.	
370	Tester: Enters command to print a summary report of performance data from the two performance test runs.	
380	Expected Result: The summary report is printed. The results are used for post test analysis to determine the necessity of modifying or potential enhancements to system.	
Data Reduction and Analysis Steps: The analysis extends to the system software, hardware, and personnel at the LaRC. Performance is also measured by the ability of the staff at the site to use operational procedures and documentation to establish nominal operations, provide status information to SMC on request, and maintain processing capacity with reserves and expansion as required. In addition, the reports generated during the test will be analyzed to confirm the system performance information are monitored successfully.		
Signature:		Date:

8.6 Ancillary Services Scenario

This scenario takes site management personnel through a series of cases involving the use of system services in the management of the site. It carries the site management staff through certain system fault detection and isolation instances, security monitoring episodes, and accounting and report generation sequences. AT of fault management activity evaluates the capability for performing site-level fault analysis, fault diagnostic testing and recovery actions. Evaluation of ECS accounting and accountability activities extends to LSM in-site functions including related data collection, analysis and reporting activities is assessed. Evaluation of ECS report generation capabilities extends to evaluating the capability for providing required reports specified by all of the services referenced in the system management scenario group.

8.6.1 Fault Management Sequence

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, DMS, DPS, DSS, INS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed:

SMC

EOC

GSFC ECS DAAC

EDC ECS DAAC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence are listed:

DAAC Computer Operator

DAAC Resource Manager

DAAC Operations Supervisor

Operational Scenario: There are no operations scenarios, taken from the Operations Scenarios for the ECS Project: Release-A (605/OP1), used during this sequence of tests.

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.6.1.1 Data Archive and Distribution Fault Analysis and Diagnostic Testing

TEST Procedure No.: A080610.020\$	Date Executed:	Test Conductor:
Title:	Data Archive and Distribution Fault Analysis and Diagnostic Testing	
Objective:	This test verifies the fault management requirements for the disk archive and distribution subsystem of the ECS. Simulated faults are induced in the subsystem to verify fault detection, fault isolation and reporting.	
Requirements	Acceptance Criteria	
DADS0901#A	<p>This requirement is verified through test.</p> <p>The DADS element shall collect the management data used to support the following system management functions:</p> <ul style="list-style-type: none"> a. Fault Management b. Configuration Management d. Accountability Management e. Performance Management f. Security Management g. Scheduling Management h. Distribution and Ingest Management <p>A storage media fault induced into the DSS must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC. The test does not include DADS0901#1 items b through h.</p>	
DADS1300#A	<p>This requirement is verified through test.</p> <p>Each DADS shall display all faults to the system operators.</p> <p>A storage media fault induced into the DSS must be detected and displayed to the system operators.</p>	
DADS1310#A	<p>This requirement is verified through test.</p> <p>Each DADS shall track and report to the SMC problems such as missing or corrupted files requiring restoration or regeneration of data.</p> <p>A missing file fault induced into the DSS must be detected, logged and reported to the SMC.</p>	
DADS1320#A	<p>This requirement is verified through test.</p> <p>Each DADS shall provide to the SMC fault isolation information at the DADS system and subsystem levels.</p> <p>The DSS must report the failed device name or media, failure code or reason and the time/date of the failure to the SMC for all induced DSS faults.</p>	
DADS1330#A	<p>This requirement is verified through test.</p> <p>Each DADS shall provide information to support fault isolation between the DADS and other ECS-unique elements and external interfaces to the LSM.</p> <p>A fault induced during a science software package delivery must be reported in the Error Log with sufficient information included to support isolation of the fault..</p>	

EOSD0730#A	<p>This requirement is verified through test.</p> <p>Each ECS element shall be capable of verifying the fidelity of the ECS element interface to:</p> <ul style="list-style-type: none"> a. Other ECS elements at any time during the lifetime of the ECS b. Entities external to ECS at any time during the lifetime of the ECS <p>The MSS must be able to accurately depict the operational status of all ECS elements and update this status following simulated faults including a storage media fault, missing file fault, and DADS interface fault.</p>
EOSD4035#A	<p>This requirement is verified through test.</p>
IMS-1620#A	<p>This requirement is verified through test.</p> <p>The IMS element shall collect the management data used to support the following system management functions:</p> <ul style="list-style-type: none"> a. Fault Management b. Configuration Management d. Accountability Management e. Performance Management f. Security Management g. Scheduling Management. <p>A storage media fault induced into the DSS must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC. The test does not include IMS-1620#A items b through g.</p>
IMS-1760#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall send detected hardware faults to the SMC, to include at a minimum:</p> <ul style="list-style-type: none"> a. IMS processors b. IMS network interfaces c. Storage devices <p>Simulated faults including a storage media fault, missing file fault, and DADS interface fault must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC.</p>
NI-0430#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to receive notification of faults in the NOLAN network that may affect the quality of NOLAN services between ECS and its users.</p> <p>Simulated faults including a storage media fault, missing file fault, and DADS interface fault must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC.</p>
NI-0440#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to receive information regarding fault status and estimated time to repair or resolve NOLAN faults that may affect the quality of NOLAN services between ECS and its users.</p> <p>Simulated faults including a storage media fault, missing file fault, and DADS interface fault must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC.</p>

NI-0450#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to receive periodic summary information about faults that may have affected the quality of NOLAN services between ECS and its users.</p> <p>Simulated faults including a storage media fault, missing file fault, and DADS interface fault must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC.</p>
NI-0470#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to receive notifications of security breaches at NOLAN sites or within the NOLAN network that could potentially affect ECS sites.</p>
NI-0480#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability to send to NOLAN notifications of security breaches at ECS facilities that could affect NOLAN and other EOSDIS sites.</p> <p>Simulated faults including a storage media fault, missing file fault, and DADS interface fault must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC.</p>
SMC-4315#A	<p>This requirement is verified through test.</p> <p>The LSM shall, at a minimum, isolate, locate, and identify faults, identify subsystem, equipment, and software faults, and identify the nature of the faults within its element.</p> <p>The MSS must be able to accurately depict the operational status of all ECS elements and update this status following simulated faults including a storage media fault, missing file fault, DADS interface fault, and data processing fault.</p>
SMC-4325#A	<p>This requirement is verified through demonstration.</p> <p>The LSM shall request fault diagnosis testing be performed, including, at a minimum:</p> <ul style="list-style-type: none"> a. Software and hardware tolerance testing b. Resource-to-resource connectivity testing within its element <p>The MSS Fault Management Application Service must correctly fault isolate a storage media fault, missing file fault, DADS interface fault, and data processing fault.</p>
SMC-4335#A	<p>This requirement is verified through test.</p> <p>The LSM shall generate fault recovery commands, directives, and instructions within its element.</p> <p>The MSS Fault Management Application Service must provide instructions for returning the failing resources to service.</p>

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
Storage Media Fault Test		
10	Resource Manager: Login to the DAAC MSS server workstation using a valid ID and password as an administrator.	
20	Resource Manager: Initialize HP OpenView.	
30	Expected Result: A map depicting the overall topology is displayed.	
40	Resource Manager: Double click on the 'LaRC' icon to bring up the LaRC window.	
50	Select 'Options' from the menu bar, followed by 'Topology/Status Polling : IP...'	
60	Expected Result: A map depicting the site configuration is accurately displayed. All icon symbols are on-line, displayed in green.	
70	Resource Manager: Simulate a device failure by taking the APC Server RAID storage device off-line.	
80	Expected Results: The icon for the RAID storage device is red and the LaRC icon is yellow.	
90	Resource Manager: Double click on Diagnose, Network Activity, Demand Poll .	
100	Expected Result: Hardware polling is initiated.	
110	Resource Manager: Double click on the red RAID storage device icon.	
120	Expected Results: Node submap opens with RAID storage interface red.	
130	Resource Manager: Place the APC Server RAID storage device back on-line.	
140	Expected Result: Submap icons are green.	
150	Resource Manager: Open the Event Categories window.	
160	Resource Manager: Select Error Events from the list of event categories.	
170	Expected Results: The Event Browser window displays a list of error events.	
180	Verify the Event Browser displays the proper information in accordance with the Data Reduction and Analysis Steps A through C.	
190	Operations Supervisor: Login to the MSS server workstation using a valid ID and password as an administrator.	
200	Operations Supervisor: Initialize HP OpenView using the <ovw &> command.	
210	Operations Supervisor: A map depicting the overall topology is displayed.	

220	Operations Supervisor: Double click on the 'LaRC' icon to bring up the LaRC window.	
230	Operations Supervisor: Open the Event Categories window	
240	Operations Supervisor: Select Error Events from the list of event categories.	
250	Expected Results: The Event Browser window displays a list of error events.	
260	Verify the Event Browser displays the proper information in accordance with the Data Reduction and Analysis Steps A through C.	
270	Exit HP OpenView	
Missing File Fault		
310	Production Planner: Rename a file required by a science software package.	
320	Production Planner: Submit the processing request to run the science algorithm.	
330	Expected Results: The science software halts with an error message identifying the missing data file.	
340	Production Planner: Initialize HP OpenView.	
350	Expected Results: A map depicting the overall topology is displayed.	
360	Production Planner: Open the Event Categories window.	
370	Production Planner: Select Application Alert Events from the list of event categories.	
380	Expected Results: The Event Browser window displays a list of error events.	
390	Verify the Event Browser displays the proper information in accordance with the Data Reduction and Analysis Steps D through F.	
400	Exit HP OpenView.	
DADS Interface Test		
500	Data Specialist: Initialize HP OpenView.	
510	Expected Result: A map depicting the overall topology is displayed.	
520	Data Specialist: Double click on the 'LaRC' icon.	
530	Expected Result: A map depicting the LaRC configuration is accurately displayed with all symbols displayed in green (on-line).	
540	Data Specialist: Begin transfer of the Science Software Package.	
550	Data Specialist: Shutdown the local host.	
560	Expected Results: The file transfer is halted. The host symbol on the Open View LaRC map is red.	
570	Data Specialist: Examine the history log containing the fault report.	
580	Expected Results: The history log verifies the host fault and file transfer fault.	

Data Processing Fault Test		
610	Production Planner: Login to the DAAC MSS server workstation using a valid ID and password as an administrator.	
620	Production Planner: Initialize HP OpenView.	
630	Expected Result: A map depicting the overall topology is displayed.	
640	Production Planner: Double click on the 'LaRC' icon.	
650	Expected Result: A window for 'Imp' is displayed.	
660	Production Planner: Double click on the science data processing icon.	
670	Expected Result: A window for the science data processor is displayed.	
680	Production Planner: Login to the science data processor.	
690	Production Planner: Activate the Autosys GUI using the autosc & command	
700	Expected Result: The Autosys GUI is displayed.	
710	Production Planner: Activate the Autosys Job Activity Console GUI.	
720	Expected Result: The Autosys Job Control Panel is displayed.	
730	Production Planner: Click on the Job Definition button in the Control Panel.	
740	Expected Result: The Job Definition dialog box is displayed.	
750	Production Planner: Using the Job Definition dialog box, submit a job for execution.	
760	Production Planner: Shutdown the science data processor.	
780	Expected Result: Execution of the science data processing job is stopped.	
790	Production Planner: Using HP OpenView, display system status.	
800	Expected Results: a. The icon for LaRC is red b. The icon for IP icon is red c. The icon for the science processor is red d. The fault is logged in the error log file	
810	Resource Controller: Login at the SMC MSS server workstation using a valid ID and password as an administrator.	
820	Resource Controller: Initialize HP OpenView.	
830	Expected Results: A map depicting the overall topology is displayed. The LaRC icon is red.	
840	Resource Controller: Double click on the 'LaRC' icon.	
850	Expected Results: a. A window for 'IPMap' is displayed. b. The IP icon is red c. The icon for the LaRC science processor is red	
860	Resource Controller: Restart the science data processor.	

870	<p>Expected Results: HP OpenView on the MSS Server indicates the following status:</p> <ul style="list-style-type: none"> a. The icon for LaRC is red b. The icon for IP icon is red c. The icon for the science processor is red d. The fault is logged in the error log file 	
880	Resource Controller: Check the status of science data processing jobs.	
890	Expected Result: The submitted science data processing job has a status of [JOB FAILURE].	
<p>Data Reduction and Analysis Steps:</p> <p>A. The following materials should be secured for analysis:</p> <ul style="list-style-type: none"> 1. Error Event Log Printout. <p>B. Search the list of error events to find the APC Server RAID storage device failure produced by this test.</p> <p>C. Verify that the Event Browser provides the following information:</p> <ul style="list-style-type: none"> 1. Severity is critical 2. Date/Time of the fault are correct 3. Source identifies the APC Server RAID storage device 4. An appropriate message identifies the fault <p>D. The following materials should be secured for analysis:</p> <ul style="list-style-type: none"> 1. Error Event Log Printout. <p>E. Search the list of error events to find the APC Server RAID storage device failure produced by this test.</p> <p>F. Verify that the Event Browser provides the following information:</p> <ul style="list-style-type: none"> 1. Severity is critical 2. Date/Time of the fault are correct 3. Source identifies a science data processing fault 4. An appropriate message identifies the fault 		
Signature:		Date:

8.6.1.2 Product Generation Fault Analysis and Diagnostic Testing

TEST Procedure No.: A080610.030\$L		Date Executed:		Test Conductor:	
Title: Product Generation Fault Analysis and Diagnostic Testing					
Objective: This test verifies the fault management requirements for the product generation subsystem of the ECS. Simulated faults are induced in the subsystem to verify fault detection, fault isolation and reporting.					
Requirements		Acceptance Criteria			
PGS-0320#A		This requirement is verified by test. The PGS must display detected faults to the system operators. The science processor is shutdown during a science data processing job. The fault must be detected and displayed to the system operators.			
PGS-0330#A		This requirement is verified by test. The PGS must report detected processing system faults to the SMC. The science processor is shutdown during a science data processing job. The fault must be detected and sent to the SMC.			
PGS-0340#A		This requirement is verified by test. The PGS must utilize fault isolation tools provided by the LSM for the PGS and its subsystems. The science processor is shutdown during a science data processing job. The detected fault must be isolated at the LSM.			
PGS-0350#A		This requirement is verified by test. The PGS must utilize tools provided by the LSM to support fault isolation between the PGS and external interfaces. The science processor is shutdown during a science data processing job. The detected fault must be isolated at the LSM.			
PGS-1000#A		This requirement is verified through test. The PGS shall provide error logging subroutines for use by Standard Product software in notifying users of conditions requiring their attention. This requirement is verified in steps 200-d and 270-d.			
Test Inputs:					
Data Set Name	Data Set ID	File Name	Description	Version	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Production Planner: Login to the DAAC MSS server workstation using a valid ID and password as an administrator.	
20	Production Planner: Initialize HP OpenView.	
30	Expected Result: A map depicting the overall topology is displayed.	
40	Production Planner: Double click on the 'LaRC' icon.	
50	Expected Result: A window for 'IPMap' is displayed.	
60	Production Planner: Double click on the science data processing icon.	
70	Expected Result: A window for the science data processor is displayed.	
80	Production Planner: Login to the science data processor.	
90	Production Planner: Activate the Autosys GUI using the autosc & command	
100	Expected Result: The Autosys GUI is displayed.	
110	Production Planner: Activate the Autosys Job Activity Console GUI.	
120	Expected Result: The Autosys Job Control Panel is displayed.	
130	Production Planner: Click on the Job Definition button in the Control Panel.	
140	Expected Result: The Job Definition dialog box is displayed.	
150	Production Planner: Using the Job Definition dialog box, submit a job for execution.	
160	Production Planner: Shutdown the science data processor.	
180	Expected Result: Execution of the science data processing job is stopped.	
190	Production Planner: Using HP OpenView, display system status.	
200	Expected Results: a. The icon for LaRC is red b. The icon for IP icon is red c. The icon for the science processor is red d. The fault is logged in the error log file	
210	Resource Controller: Login at the SMC MSS server workstation using a valid ID and password as an administrator.	
220	Resource Controller: Initialize HP OpenView.	
230	Expected Results: A map depicting the overall topology is displayed. The LaRC icon is red.	
240	Resource Controller: Double click on the 'LaRC' icon.	

250	Expected Results: a. A window for 'IPMap' is displayed. b. The IP icon is red c. The icon for the LaRC science processor is red	
260	Resource Controller: Restart the science data processor.	
270	Expected Results: HP OpenView on the MSS Server indicates the following status: a. The icon for LaRC is red b. The icon for IP icon is red c. The icon for the science processor is red d. The fault is logged in the error log file	
280	Resource Controller: Check the status of science data processing jobs.	
290	Expected Result: The submitted science data processing job has a status of [JOB FAILURE].	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.1.3 Communications Fault Analysis and Diagnostics Testing

TEST Procedure No.: A080610.050\$L	Date Executed:	Test Conductor:
Title:	Communications Fault Analysis and Diagnostic Testing	
Objective:	This test verifies the fault management requirements for the communications subsystem of the ECS. Simulated faults are induced in the subsystem to verify fault detection, fault isolation and reporting.	
Requirements	Acceptance Criteria	
ESN-0650#A	<p>This requirement is verified through test.</p> <p>The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility:</p> <ul style="list-style-type: none"> a. Network Configuration Management b. Network Fault Management c. Network Performance Management d. Network Security Management <p>A CSS fault induced by interrupting a network connection must be properly managed such that the fault is detected, system operators are notified about the fault, and the fault is logged and forwarded to the SMC. This test does not include ESN-0650#A items a, c and d.</p>	
ESN-0740#A	<p>This requirement is verified by test.</p> <p>The ESN network management service shall retrieve performance/fault data about ESN protocol stacks and equipment.</p> <p>A CSS fault induced by interrupting a network connection must be detected and information provided that accurately identifies the fault. Performance data is not tested in this test case.</p>	

ESN-0810#A	<p>This requirement is verified through test.</p> <p>ESN shall provide the following fault management functions at a minimum:</p> <ol style="list-style-type: none"> detect the occurrence of faults, control the collection of fault information, and diagnose the probable cause of a detected fault <p>A CSS fault induced by interrupting a network connection must be detected, accurately diagnosed, and logged.</p>
ESN-0815#A	<p>This requirement is verified through analysis.</p> <p>Network simulation and traffic modeling capability shall be provided to troubleshoot network problems and to use in network planning.</p> <p>The Tester uses network simulation to solve the network fault.</p>
ESN-0830#A	<p>This requirement is verified through test.</p> <p>The ESN shall have the capability to detect and report communications related errors and events both locally and at the ESN network management facility.</p> <p>An ISS fault induced by interrupting a network connection must be detected, accurately diagnosed, logged and reported locally and at the SMC.</p>
ESN-0840#A	<p>This requirement is verified through test.</p> <p>The ESN shall have error reporting, event logging and generation of alerts.</p> <p>A CSS fault induced by interrupting a network connection must be reported and logged in the event log file and alerts generated.</p>
ESN-0900#A	<p>This requirement is verified through test.</p> <p>Errors and events to be detected shall include at least:</p> <ol style="list-style-type: none"> communications software version or configuration errors communications hardware errors protocol errors performance degradation conditions telecommunications errors and failures <p>CSS faults induced by interrupting a telecommunication connection, network connection, or configuration error must be reported and logged in the event log file and alerts generated. This test does not test item d of the requirement</p>
ESN-0910#A	<p>This requirement is verified through test.</p> <p>The ESN fault management shall provide the capability to perform the following functions, at a minimum, both locally and at the ESN network management facility:</p> <ol style="list-style-type: none"> set, view, and change alert threshold values enable and disable alert notifications (alarms) within a system enable and disable event reports within a system manage error and event logging files <p>The MSS Monitor/Control Service will be used to set fault thresholds, enable/disable alarms and reports caused by CSS faults and schedule the transfer of fault management data to the SMC.</p>
ESN-0920#A	<p>This requirement is verified through inspection.</p> <p>The ESN shall provide a set of utilities to perform diagnostic and testing functions for purposes of fault isolation.</p> <p>The MSS Fault Management Application Service will provide utilities to perform diagnostics and testing of connectivity between ECS hosts and router, the ability to reach hosts and routers, and the availability of network services at hosts.</p>

ESN-1000#A	<p>This requirement is verified through demonstration.</p> <p>The ESN network management function shall have the capability to build histories for different types of errors and events, and the capability to analyze errors and recommend corrective action wherever practical.</p> <p>The MSS Fault Management Application Service will demonstrate the ability to build histories for different types of errors and events detected, for the purpose of analysis.</p>
ESN-1010#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide, for selective use as a debugging aid, the capability to perform packet tracing of its supported protocols.</p> <p>This requirement is verified during Integration and Test and is not verified during this test.</p>
NSI-0030#A	<p>This requirement is verified through test.</p> <p>NSI shall have the capability of sending and ECS shall have the capability of receiving notification of faults in NSI's network that may affect the quality of NSI services between ECS and its users.</p> <p>The Tester will send a fault notification message across the NSI.</p>
NSI-0040#A	<p>This requirement is verified through test.</p> <p>NSI shall make available to ECS information regarding fault status and estimated time to repair or resolve NSI faults that may affect the quality of NSI services between ECS and its users.</p> <p>The MSS will receive notification of NSI faults.</p>
NSI-0050#A	<p>This requirement is verified through test.</p> <p>NSI shall provide ECS with periodic summary information about faults that may have affected the quality of NSI services between ECS and its users.</p> <p>The MSS will receive periodic summary information about NSI faults.</p>

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
Communications Hardware Fault		
10	Computer Operator: Logon the MSS server workstation.	
20	Computer Operator: Initialize HP OpenView .	
30	Expected Results: A map depicting the overall topology is displayed.	
40	Computer Operator: Double click on the LaRC icon.	
50	Expected Results: A map depicting the LaRC DAAC configuration is accurately displayed with all symbols displayed in green.	
60	Computer Operator: Prepare to send an EMAIL message of considerable length (20 pages or more) to another DAAC.	
70	Tester: Instruct the Computer Operator to send the EMAIL message, wait approximately 2 seconds then remove power from the FDDI concentrator.	
80	Expected Results: a. The FDD Concentrator symbol is red b. Audible alarm sounds c. The fault is logged in the error log file d. The fault is forwarded to the SMC	
90	Computer Operator: Double click on the red FDDI concentrator symbol.	
100	Expected Results: Information accurately describing the fault is displayed.	
110	Computer Operator: Close the window for the FDDI concentrator	
120	Tester: Restore power to the FDDI concentrator.	
130	Expected Results: The FDDI concentrator symbol is green.	
140	Computer Operator: Verify the fault is accurately logged and described in the error log file.	
Network Communications Fault		
150	Tester: Disconnect the LAN cable from the ingest server.	
160	Expected Results: a. The ingest server symbol is red b. Audible alarm sounds c. The fault is logged in the error log file d. The fault is forwarded to the SMC	
170	Computer Operator: Double click on the red ingest server symbol.	
180	Expected Results: Information accurately describing the fault is displayed.	

190	Computer Operator: Close the window for the ingest server.	
200	Tester: Restore the ingest server LAN connection.	
210	Expected Results: The ingest server symbol is green.	
220	Computer Operator: Verify the fault is accurately logged and described in the error log file.	
Communication Configuration Fault		
230	Tester: Change the IP address of one data management server.	
240	Expected Results: a. The data management server symbol is red b. Audible alarm sounds c. The fault is logged in the error log file d. The fault is forwarded to the SMC	
250	Computer Operator: Double click on the red data management server symbol.	
260	Expected Results: Information accurately describing the fault is displayed.	
270	Computer Operator: Close the window for the data management server.	
280	Tester: Restore the data management server IP address.	
290	Expected Results: The data management server symbol is green.	
300	Computer Operator: Verify the fault is accurately logged and described in the error log file.	
Histories		
310	Computer Operator: Initiate the MSS Fault Management Application Service.	
320	Expected Result: The MSS Fault Management Application Service appears on the screen.	
330	Using the MSS Fault Management Application Service, build a history for all communications faults for today's date.	
340	Expected Results: The MSS Fault Management Application Service displays a history of all communications faults produced by this test.	
Fault Management		
350	Computer Operator: Initiate the MSS Monitor/Control Service.	
360	Expected Result: The MSS Monitor/Control Service application appears on the screen.	
370	Computer Operator: Change threshold values managed resources.	
380	Expected Result: The MSS Monitor/Control Service accepts valid threshold value changes.	
390	Computer Operator: Change the enable/disable alert status of managed resources.	

400	Expected Result: The MSS Monitor/Control Service accepts changes to the enable/disable alert status of managed resources.	
410	Computer Operator: Exit the MSS Monitor/Control Service.	
420	Computer Operator: Initiate the MSS Fault Management Application Service.	
430	Expected Result: The MSS Fault Management Application Service appears on the screen.	
440	Computer Operator: Configure the application to display all fault categories.	
450	Expected Result: A list of all managed resources is displayed.	
460	computer Operator: Change the enable/disable fault notification status of at least two managed resources.	
470	Expected Result: The MSS Fault Management Application Service accepts the changes.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.1.4 Trouble Ticketing

TEST Procedure No.: A080610.060\$L	Date Executed:	Test Conductor:		
Title: Trouble Ticketing				
Objective: This test verifies the ability to submit a trouble ticket.				
Requirements		Acceptance Criteria		
SMC-8860#A		<p>This requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary fault management reports describing the fault management of ground resources, including, at a minimum:</p> <ul style="list-style-type: none"> a. Fault type and description b. Time of occurrence of fault c. Effect on system d. Status of fault resolution e. Fault statistics <p>The Trouble Ticketing Service must have a graphical user interface to support the entry and editing of trouble tickets.</p>		
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC User Services Representative: Upon realization that a problem exists, selects the Trouble Ticket icon from the ECS Desktop.	
20	Expected Results: ECS Desktop invokes user-preferred browser with Trouble Ticketing home page URL.	
30	DAAC User Services Representative: Views Trouble Ticketing HTML home page options.	
40	Expected Results: Options: Submit TT, List TTs are displayed on the screen.	
50	DAAC User Services Representative: Selects the Submit Option.	
60	Expected Results: The system calls the Trouble Ticket Submit page. The system automatically retrieves user information from database. (e.g., e-mail address, name, phone number, etc.).	
70	DAAC User Services Representative: Enters problem impact, problem short description, and problem long description. When satisfied with the entry, clicks on the submit button to submit TT.	
80	Expected Results: The system creates new entry in Remedy, notifies Operations Supervisor, displays successful submission HTML page (except for internal submissions) which includes the TT number, and notifies User via e-mail which also includes the TT number.	
90	DAAC User Services Representative: Receives e-mail verifying that the TT was submitted.	
100	Expected Results: An e-mail message receipt notification pop-up window is displayed on the screen. The system notifies the Operations Supervisor of the new Trouble Ticket.	
110	Operations Supervisor: Refreshes TT list to check for most recent TTs.	
120	Expected Results: The system (Remedy) refreshes list.	
130	Operations Supervisor: Selects TT for work and opens it.	
140	Expected Results: The system (Remedy) opens TT.	
150	Operations Supervisor: On examining the detailed information, changes the value of Ticket Status from New to Assigned.	
160	Expected Results: The system displays the Options: Assigned, Forwarded.	
170	Operations Supervisor: Assigns the value of Low to the Assigned-Priority field.	
180	Expected Results: The system displays the Options: Low, Medium, High)	
190	Operations Supervisor: Assigns the Trouble Ticket to a particular Computer Operator to fix the problem and clicks on Apply to carry out these new changes.	

200	Expected Results: The system (Remedy) delivers e-mail to the Computer Operator.	
210	Computer Operator: Receives e-mail notifying him/her of the assignment.	
220	Expected Results: An e-mail message receipt notification pop-up window is displayed on the screen.	
230	Computer Operator: Inputs an initial entry into the Resolution Log (which is a free text diary) indicating the proposed course of action.	
240	Expected Results: The Resolution Log displays the initial entry.	
250	Computer Operator: Then clicks on Apply to update the TT with this status.	
260	Expected Results: The system (Remedy) updates TT.	
270	Computer Operator: Analyzes and attempts to resolve the issue that the TT addresses, then updates the Resolution Log with pertinent information. Each update to the Resolution Log is followed by a click on the Apply button to commit the update.	
280	Expected Results: The system (Remedy) updates Resolution Log with time/date, name of modifier and current log.	
290	Computer Operator: After finding a solution, changes the Ticket Status to Solution Proposed	
300	Expected Results: The system displays the Options: Solution Proposed.	
310	TT Review Board: Compiles a package of new "Solution Proposed" TTs for review by the board. Considers the sensibility and long term effects of the proposed solution for this TT. Approves the solution and changes the Status to Implement Solution .	
320	Expected Results: Options: Forwarded, Closed, Implement Solution are displayed on the screen.	
330	Computer Operator: Fixes the problem and changes Status to Solution Implemented .	
340	Expected Results: The problem is corrected and the new status displayed on the screen is Solution Implemented .	
350	TT Review Board: Approves fix select Key Words , Closing Code , Hardware Resource , and/or Software Resource values as applicable, and upon User Verification Closes TT.	
360	Expected Results: The trouble ticket is closed.	
370	Computer Operator: Sends e-mail to the DAAC User Services Representative notifying him/her of the TT being closed.	
380	Expected Results: An e-mail message receipt notification pop-up window is displayed on the screen.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.1.5 Non Conformance Report

TEST Procedure No.: A080610.070\$L	Date Executed:	Test Conductor:		
Title: Non Conformance Report				
Objective: This test verifies the ability of recording and reporting of a software problem.				
Requirements		Acceptance Criteria		
SMC-8860#A		This requirement is verified through test. The SMC shall have the capability to generate detailed and summary fault management reports describing the fault management of ground resources, including, at a minimum: a. Fault type and description b. Time of occurrence of fault c. Effect on system d. Status of fault resolution e. Fault statistics The Trouble Ticketing Service must have a graphical user interface to support the entry and editing of trouble tickets.		
Test Inputs:				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	DAAC User Services Representative: Takes a call (or E-mail) reporting a software defect and clicks on the Trouble Ticketing tool icon on his desktop.	
20	Expected Results: Trouble Ticketing application starts up.	
30	DAAC User Services Representative: Fills in items in Trouble Ticket (e.g., application, platform, version, description, user information and E-mail address etc.) based on User's inputs. Rep confirms items with user, and submits ticket. For E-mail correspondence, a message is sent to the user with this information.	
40	Expected Results: Application submits the ticket to Remedy.	
50	DAAC User Services Representative: Regularly monitors trouble ticket status and notifies user when problem is resolved.	
60	Expected Results: Application notifies user when resolution is implemented.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.2 Security Management Sequence

This sequence provides the guidance in verifying the LSM's capabilities for establishing and maintaining security management data bases and for site-level security activities. This sequence verifies the LSM site-level abilities related to physical security password management, operational security, data security, privileges, and security compromise mitigation. The presence of system-level services for access control, authentication of user credentials is confirmed. Countermeasures for security threats such as unauthorized modification of data, disclosure of authentication information, denial of authorized service, and impersonation of authentication information, is also confirmed. Authentication, access control, data integrity, and data confidentiality protection functions are confirmed and evaluated against system and site requirements. Event functions (detection, reporting, and logging) are demonstrated and confirmed by comparison with system and site requirements.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & ISS. Refer to Appendix D for additional detail.

External Interfaces: The external interface (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) is listed:

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607/OP2) needed to support this sequence are listed:

DAAC Resource Manager

DAAC Computer Operator

Operational Scenario(s): The operations scenario, taken from the Operations Scenarios for the ECS Project: Release-A document (605/OP1), that was used to develop tests in this sequence of tests are listed:

Security Management Login Failure Scenario (Section 3.6.1)

Test Dependencies: There are no test dependencies needed for this sequence of tests.

8.6.2.1 SMC Security Functions

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.6.2.2 LSM Security Functions

TEST Procedure No.: A080620.040\$L	Date Executed:	Test Conductor:
Title:	LSM Security Functions	
Objective:	The objective of this test is to verify the LSM security functions; such as maintaining, authenticating, and monitoring user and device accesses and privileges; performing security testing that includes, password auditing and site internal access/privileges checking; performing compromise detection (e.g. virus or worm penetration); and performing risk detection and analyses.	
Requirements	Acceptance Criteria	
DADS1085#A	This requirement is verified through test. Each DADS shall maintain a data access log. The Tester must be able to access the data access log.	
EOSD2400#A	This requirement is verified through test. ECS shall provide multiple categories of data protection based on the sensitivity levels of ECS data, as defined in NHB 2410.9. The system must control access to archived data to prevent unauthorized access. The system must authenticate that the interactive user is authorized.	

EOSD2510#A	<p>This requirement is verified through demonstration.</p> <p>ECS elements shall maintain an audit trail of:</p> <ul style="list-style-type: none"> a. All accesses to the element security controlled data b. Users/processes/elements requesting access to element security controlled data c. Data access/manipulation operations performed on security controlled data d. Date and time of access to security controlled data e. Unsuccessful access attempt to the element security controlled data by unauthorized users/elements/processes f. Detected computer system viruses and worms g. Actions taken to contain or destroy a virus <p>The CSS Security service must provide the capability to log audit information into security logs whenever authentication and authorization services are used. The audit information must contain the following:</p> <ul style="list-style-type: none"> a. Date and time of the event b. User name c. Type of event d. Success or failure of the event e. Origin of the request.
EOSD2550#A	<p>This requirement is verified through test.</p> <p>The ECS elements shall limit use of master passwords or use of a single password for large organizations requiring access to a mix of security controlled and non-sensitive data.</p> <p>The System must require a unique user identification and password for each individual user.</p>
EOSD2650#A	<p>This requirement is verified through test.</p> <p>The LSM shall report detected security violations to the SMC.</p> <p>The LSM must contact the SMC in the event of a security violation via electronic mail or telephone.</p>
EOSD2710#A	<p>This requirement is verified through demonstration.</p> <p>ECS elements shall report all detected computer viruses and actions taken to the SMC.</p> <p>The System must provide virus detection services. The LSM must report detected security violations to the SMC.</p>
ESN-0010#A	<p>This requirement is verified through test.</p> <p>ESN shall provide the following standard services:</p> <ul style="list-style-type: none"> a. Data Transfer and Management Services b. Electronic Messaging Service c. Remote Terminal Service d. Process to Process Communication Service e. Directory and User Access Control Service f. Network Management Service g. Network Security and Access Control Service h. Internetwork Interface Services i. Bulletin Board Service <p>The Tester must verify the various LSM security functions.</p> <p>This test does NOT verify parts a, b, c, d, e, f, h, and i of the requirement.</p>

ESN-0650#A	<p>This requirement is verified through test.</p> <p>The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility:</p> <ul style="list-style-type: none"> a. Network Configuration Management b. Network Fault Management c. Network Performance Management d. Network Security Management <p>The CSS Security service must provide the capability to create/modify/delete user accounts and privileges in the security registry. The CSS Security service must provide the capability to define/modify/delete group information in the security registry. This test does NOT verify parts a, b and c of the requirement.</p>
ESN-1360#A	<p>This requirement is verified through test.</p> <p>The ESN shall control access of processes and users through an authentication and authorization service that meets GNMP standards. The authentication and authorization service must meet GNMP standards.</p>
ESN-1380#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide countermeasures for the following security threats related to data communications:</p> <ul style="list-style-type: none"> a. modification of data (i.e., manipulation) while in transit over the network b. disclosure of authentication information c. degradation in network or processing resource performance through denial of service attack d. Impersonation of authentication credentials or authorization privileges. <p>The CSS Security service must provide an API to check the authorization privileges of principals to access/control services/resources. The CSS Security service must support the Data Encryption Standard (DES) to encrypt and decrypt data.</p>
ESN-1400#A	<p>This requirement is verified through test.</p> <p>The following security functions and services, at a minimum, shall be provided:</p> <ul style="list-style-type: none"> a. authentication b. access (authorization) control c. data integrity d. data confidentiality. <p>The CSS Security service must provide an API to check the authorization privileges of principals to access/control services/resources. The CSS Security service must support the Data Encryption Standard (DES) to encrypt and decrypt data.</p>
ESN-1430#A	<p>This requirement is verified through test.</p> <p>The ESN shall provide the following security event functions:</p> <ul style="list-style-type: none"> a. Event detection b. Event reporting c. Event logging. <p>CSS Event Logger Service must provide capability to record security event and history data to an application specific log file.</p>
IMS-1665#A	<p>This requirement is verified through demonstration.</p> <p>The IMS shall provide to the SMC, IMS services usage by each user (to include at a minimum user name, IMS service identification, date/time stamp, time expended, facilities used) for later reporting and determination of access patterns.</p> <p>The GTWAY CI must log Service requests. The GTWAY CI must log the termination or successful completion of service requests. The log must provide IMS services usage by each user (to include at a minimum user name, IMS service identification, date/time stamp, time expended, facilities used).</p>

NSI-0070#A	<p>This requirement is verified through test.</p> <p>NSI shall have the capability of sending and ECS shall have the capability of receiving notification of security breaches at NSI sites or within the NSI network that could potentially affect ECS sites.</p> <p>The Tester must receive NSI security breach notifications.</p>
NSI-0080#A	<p>This requirement is verified through test.</p> <p>ECS shall have the capability of sending and NSI shall have the capability of receiving notification of security breaches at ECS facilities that could affect NSI and other EOSSDIS sites.</p> <p>The Tester must sent ECS security breach notifications to the NSI.</p>
SMC-5335#A	<p>This requirement is verified through test.</p> <p>The LSM shall perform security testing that includes, at a minimum, password auditing and element internal access/privileges checking.</p> <p>The MSS site Security Management Application Service must have the capability to perform the following types of security tests:</p> <ol style="list-style-type: none"> password auditing file system integrity checking auditing of user privileges auditing of resource access control information.
SMC-5345#A	<p>This requirement is verified through inspection.</p> <p>The LSM shall perform compromise (e.g., virus or worm penetration) risk analysis, and detection.</p> <p>The System must provide virus detection services.</p>
SMC-5355#A	<p>This requirement is verified through test.</p> <p>The LSM shall isolate the compromised area, detach the compromised input I/O, and the compromised areas output I/O until the compromise has been eliminated.</p> <p>The MSS site Security Management Application Service must, upon the detection of a compromise, isolate the compromised input I/O, and the compromised area's output I/O until the compromise has been eliminated.</p>
SMC-5365#A	<p>This requirement is verified through test.</p> <p>The LSM shall generate recovery actions in response to the detection of compromises.</p> <p>The MSS Security Management Application Service must provide office automation support tools to enable the generation of directives and instructions for recovery from detected security events.</p>
SMC-6325#A	<p>This requirement is verified through demonstration.</p> <p>The LSM shall perform, as needed, data and user audit trails within its element.</p> <p>The LSM must have the ability to perform data and user audit trails within its element.</p>
Test Inputs: Authorized/Approved user id and password	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Resource Manager: Verifies the existence of virus detection software.	
20	Expected Results: The virus detection software is installed and operational on the system.	
30	Computer Operator: Executes a security administrator logon.	
40	Expected Results: The system displays the security administrator main menu.	
50	Computer Operator: Performs create, change and delete commands to the security registry.	
60	Expected Results: User accounts are created, changed and deleted.	
70	Computer Operator: Verifies that the user accounts contain username, password, group and user identification code, login directory and command line interpreter.	
80	Expected Results: User accounts reflect create, change and delete commands entered by the Computer Operator.	
90	Computer Operator: Logs off.	
100	Expected Results: The system displays the logon screen.	
110	Computer Operator: Executes logon with user id.	
120	Expected Results: The system displays the main menu.	
130	Computer Operator: Performs, create, change and delete commands to the security registry.	
140	Expected Results: The user accounts are created, changed and deleted from the system.	
150	Computer Operator: Verify that modifications are reflected in the user accounts.	
100	Expected Results: User accounts reflect create, change and delete commands entered by the Computer Operator.	
110	Computer Operator: Logs off.	
115	Expected Results: The ECS login screen is displayed on the screen.	
120	Computer Operator: Using SATAN and CRACK, attempts to log in by guessing passwords. Repeat multiple times.	
130	Expected Results: The security management service detects the multiple events after the preestablished threshold has been crossed. The service sends notification of security alert to the Computer Operator.	
140	Computer Operator: Receives multiple security alerts. Begins investigation into cause of alerts by invoking the events browser (log) to retrieve the security events.	

150	Expected Results: Displays the requested events. The information must contain the following: a. Date and time of the event b. User name c. Type of event d. Success or failure of the event e. Origin of the request	
160	Computer Operator: Discovers that the login attempts on the multiple hosts originated from the same area.	
170	Computer Operator: Contacts the MIS manager at the location of the User (Hacker) who proceeds to have the issue investigated locally. Sends e-mail to all ECS sites informing them of the event and to explicitly deny access from this area.	
180	Computer Operator: Modifies the network security authorization databases to deny all incoming accesses from the host in question.	
190	1st Authorized/Approved User: Logs on to ECS using a valid user id and password.	
200	Expected Results: The user is able to log onto the system. The next user screen appears.	
210	Tester: Using a network analyzer, verifies that the password is not readable over the network.	
220	2nd Authorized/Approved User: Attempts to log on to ECS using the same valid user id and password used by the 1st Authorized/Approved User in step 190.	
230	Expected Results: The user is unable to log onto the system. A message indicating the user is already logged on is displayed.	
240	1st Authorized/Approved User: Compromises the data by deleting files.	
250	Expected Result: The system detects the compromise, isolates it, until it can be eliminated.	
260	Computer Operator: Discovers that the security violation compromise.	
270	Computer Operator: Using the Office Automation tools provided, generates instructions for recovery from the detected security event.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.3 Accounting and Accountability Sequence

This sequence guides the evaluator through and assessment of the ECS and LaRC capability to perform compliant accounting and accountability functions. The SMC database for supporting, maintaining and updating accounting and accountability policies and procedures is inspected for agreement with ESDIS Project policies and procedures. SMC ability to establish, maintain, and update data tracking systems to track data transport from ECS input to ECS output, and to allow statusing of all product-production activities is confirmed by inspection of outputs.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CLS, CSS/MSS, DMS, DPS, DSS, INS, ISS, & PLS. Refer to Appendix D for additional detail.

External Interfaces: The following external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed below.

ECS Client

Operator Positions: The following operator positions are needed to support this sequence.

Computer Operator

Operational Scenario: The following scenarios, taken from the ECS Operations Concept for the ECS Project, Part 2A document, are used during this sequence of tests:

Network Data Distribution (Pull) Scenario (Nominal) Scenario (Section 3.11.2)

Accountability Management Create User Account Scenario (Section 3.6.2)

Test Dependencies: There are no test dependencies required.

8.6.3.1 Accountability: Data Tracking and Audit Trails

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.6.3.2 Accountability: LSM Data Tracking

TEST Procedure No.: A080630.030\$L	Date Executed:	Test Conductor:
Title:	LSM Data Tracking	
Objective:	This procedure verifies the ECS's ability to manage user accounts, track production activities, and to manage the configuration of system HWCI and CSCI elements.	
Requirements	Acceptance Criteria	
SMC-5325#A	This requirement is verified through test. The LSM shall promulgate, maintain, authenticate, and monitor user and device accesses and privileges. A new approved user account must be added to the system including all account attributes, privileges, resource access. Account information must be available for review and modification.	
SMC-6315#A	This requirement is verified through demonstration. The LSM must perform, as needed, security audit trails within its element. The MSS MUI must display a log of all activities for a user account and access attempts.	
SMC-6335#A	This requirement is verified through demonstration. The LSM shall perform, as needed, maintain and update a data tracking system that, at a minimum: a. Tracks data transport from element input to element output. b. Allows the status of all product-production activities to be determined. The ECS data tracking system must list data transport activities and provide status of all product-production activities.	
SMC-6345#A	This requirement is verified through demonstration. The LSM shall, as needed, perform configuration accountability to include, at a minimum, the audit of hardware and software resources within its element. The MSS configuration management application service must identify a particular software element whose version varies from the operational baseline.	

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
User Accountability Test		
10	Computer Operator: Login to the MSS server workstation using a valid ID and password as an administrator.	
20	Using the MSS Security Management Application Service GUI, create a user account with the following attributes: a. user name b. password c. group identification code d. user identification code e. login directory f. resource access privileges	
30	Expected Results: The new user account is accepted by the system.	
40	Tester: Login as a remote user using the user name and password created in step 20.	
50	Expected Result: The user is logged onto the ECS and the search and order tool appears on the users screen.	
60	Tester: Logoff as a remote user.	
70	Tester: Attempt to remote login to the ECS using an invalid password.	
80	Expected Result: The login attempt is denied.	
90	Tester: Attempt to repeat step 70 five times.	
100	Expected Result: Attempts to login are limited to five tries.	
110	Computer Operator: Using the MSS accountability management service MUI, view the activities log associated with the new user.	
120	Expected Results: The log should show one login for the new user and five unsuccessful attempts to login.	
Configuration Accountability Test		
130	Computer Operator: Using the configuration management application service, view the configuration of controlled resources that comprise the site's operational baseline.	
140	Expected Results: There are no variations from the operational baseline.	
150	Tester: Remove a printer from the site configuration.	
160	Tester: Remove a software application from the site configuration.	
150	Expected results: The configuration management application service identifies the variants from the site operational baseline.	
160	Tester: Re-install the printer in the site configuration.	
170	Tester: Re-install the removed software into the site configuration.	

180	Expected Results: The configuration management application service shows no variations from the site's operational baseline.	
190	Computer Operator: Logoff of the system.	
Data Reduction and Analysis Steps:		
Signature:		Date:

8.6.4 Report Generation Sequence

This sequence guides the evaluator in assessing ECS capability for performing the LaRC report generation required for Release A. This report generator can produce standard or customized outputs for a full range of inputs, such as a functional allocation report giving the current allocation of ground segment functions; summary configuration status reports; summary training reports; hardware configuration, system and scientific software reports; spares and consumables reports; lists of proposed enhancements; detailed and summary reports indicating the overall performance of the ECS Maintainability Status Reports; product generation status reports; ground resources performance reports; user feedback analysis reports; fault management reports; and security compromise reports. The report generators at LaRC are evaluated through inspection of output products and comparison of the products against site reporting requirements.

Configuration: The subsystem needed to perform this sequence of tests are as follows. CSS/MSS & DPS. Refer to Appendix D for additional detail.

External Interfaces: The external interfaces (i.e. other ECS sites and data sources) needed for this sequence (both real and simulated) are listed :

SMC

Operator Position(s): The operator positions from the ECS Maintenance and Operations Position Descriptions document (607-CD-001-002) needed to support this sequence are listed:

DAAC Operations Supervisor

DAAC Production Monitor

DAAC Computer Operator

Operational Scenario(s): There are no operations scenarios taken from the Operations Scenarios for the ECS Project: Release-A, used during this sequence of tests.

Test Dependencies: The following table identifies the test procedure(s) in a sequence of tests that should be run prior to or concurrently with a sequence or test procedure.

Test Procedure No.	Site/Procedure No.	Comments
A080640.030\$L	A080640.030\$S	prior

8.6.4.1 SMC Report Generator

This test procedure is not applicable for the LaRC Volume of the Acceptance Test Procedures document for Release A.

8.6.4.2 LSM Report Generator

TEST Procedure No.: A080640.030\$L	Date Executed:	Test Conductor:
Title: LSM Report Generator		
Objective: Demonstrate the existence and the capabilities of a site-specific report generator residing within the site configuration, and the capability to generate pre-defined reports.		
Requirements	Acceptance Criteria	
SMC-8305#A	This requirement is verified through test. The LSM shall have the same report generator capability as for the SMC, except it shall be limited to generating reports covering only its particular site or its particular element. The Production Monitor-QA tests that the system provides the capability of a site report generator and that input data sets are available for report access.	
SMC-8705#A	This requirement is verified through test. The LSM shall have the capability to generate the same types of reports listed under the SMC report generation service, except that each report covers only its particular site or its particular element. The Tester tests that the system provides the capability and use of a site report generator to produce standard reports.	
SMC-8710#A	This requirement is tested at the SMC and is verified through test. The SMC shall have the capability to generate summary configuration status reports that includes, at a minimum: a. Current status of all hardware, system and scientific software b. Reason why an item is not currently operational. A report is generated with summary information showing the site inventory of hardware, system and scientific software, and spares and consumables. Information generated at the SMC will be accessed for use in this test procedure.	
SMC-8750#A	This requirement is semi-automated at the SMC for this release, and is verified through analysis. The SMC shall have the capability to generate detailed and summary training reports, including, at a minimum: a. Training programs b. Training course schedules c. Training course contents d. Training course locations e. Training attendees A report is generated that has detailed and summary information on training programs, training course schedules, training course contents, training course locations, and training attendees. Information generated at the SMC will be accessed for use in this test procedure.	

ESN-0760#A	<p>This requirement is verified through test.</p> <p>The ESN report generation function shall provide, on an interactive and scheduled basis, accounting, network configuration, fault and performance management information.</p> <p>The Tester tests that the system provides the capability to report information concerning accounting, network configuration, and fault and performance management.</p>
ESN-0770#A	<p>This requirement is verified through test.</p> <p>The ESN query capability shall generate ad hoc statistics and reports based on parameters entered.</p> <p>The Tester tests that the system provides the capability and use of a site report generator to produce communication reports based on the entered parameters.</p>
ESN-0775#A	<p>This requirement is verified through test.</p> <p>The ESN management service shall have the capability to redirect its reports to different devices such as console, disk or printer.</p> <p>The Tester displays the steps involved in producing standard or customized reports through use of the site report generator, from user request through output to selected media.</p>
SMC-8770#A	<p>This requirement is satisfied at the SMC, and this requirement is verified through test.</p> <p>The SMC shall have the capability to generate, at a minimum, detailed and summary reports showing the inventory of:</p> <ol style="list-style-type: none"> Hardware, system, and scientific software Spares and consumables <p>A report is generated composed of summary information showing the site inventory of hardware, system and scientific software, and spares and consumables.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>
SMC-8790#A	<p>This requirement is satisfied at the SMC and this requirement is verified through analysis.</p> <p>The SMC shall have the capability to generate, as necessary, a list of proposed enhancements with at least these elements:</p> <ol style="list-style-type: none"> Proposal name Description of enhancement Rationale Impacts Costs Milestone schedule <p>A report is generated containing information showing site proposed enhancements with a proposal name, description of enhancement, rationale, impacts, costs, and milestone schedule.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>

SMC-8800#A	<p>This requirement is performed at the SMC using the office automation tools. This requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary reports indicating the overall performance of the ECS. At a minimum, they include:</p> <ul style="list-style-type: none"> a. Scheduled versus actual data collection, processing, retrieval, and delivery of routine data b. Scheduled versus actual data collection, processing, retrieval, and delivery of user requested data c. Reason(s) for failure to meet schedules d. Quality of the data e. Ground operations event execution f. Number of interactive user requests and timeliness of response g. User feedback <p>The SMC must have the capability to produce standard or customized reports through use of the site report generator, from user requests through output to selected media.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>
SMC-8820#A	<p>This requirement is partially complied with at the SMC for this release, and is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary reports indicating the product generation status made in processing, reprocessing, and storage of all standard products.</p> <p>The SMC must have the capability to produce standard or customized reports through use of the site report generator, from user requests through output to selected media.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>
SMC-8840#A	<p>This requirement is performed at the SMC, and this requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary reports indicating the performance of ground resources, including, at a minimum:</p> <ul style="list-style-type: none"> a. Resource availability b. Reason for down time c. Resource utilization d. Ability of resource to meet performance criteria e. Short and long-term trend analysis and capacity planning results <p>A report is generated showing the site performance of ground resources, including resource availability, reason for down time, resource utilization, the ability of resource to meet the performance criteria, and short and long-term trend analysis and capacity planning results.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>

SMC-8841#A	<p>This requirement is performed at the SMC using the office automation tools. This requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary user feedback analysis reports describing the results of analyzing user satisfaction queries, including, at a minimum:</p> <ul style="list-style-type: none">a. User informationb. Type of transactionc. Satisfaction statisticsd. User recommendationse. SMC recommendations <p>The SMC must have the capability to produce standard or customized reports through use of the site report generator, from user requests through output to selected media.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>			
SMC-8860#A	<p>This requirement is performed at the SMC using the office automation tools. This requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary fault management reports describing the fault management of ground resources, including, at a minimum:</p> <ul style="list-style-type: none">a. Fault type and descriptionb. Time of occurrence of faultc. Effect on systemd. Status of fault resolutione. Fault statistics <p>A report is generated showing the site fault management reports describing the fault management of ground resources, including, fault type and description, time of occurrence of fault, effect on system, status of fault resolution, and fault statistics.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>			
SMC-8880#A	<p>This requirement is performed at the SMC. Capabilities d, e, and g are performed by the M&O staff which generates reports using the office automation tools. Rest is automated. This requirement is verified through test.</p> <p>The SMC shall have the capability to generate detailed and summary security compromise reports indicating security compromises of ground resources and facilities, including, at a minimum:</p> <ul style="list-style-type: none">a. Security compromise type and descriptionb. Time of occurrencec. Cause of security compromised. Impact on systeme. Status of security compromise resolutionf. Security compromise statisticsg. Results of security compromise risk analysis <p>A report is generated showing the site security compromise reports indicating security compromises of ground resources and facilities, including, security compromise type and description, time of occurrence, cause of security compromise, impact on system, status of security compromise resolution, security compromise statistics, and results of security compromise risk analysis.</p> <p>Information generated at the SMC will be accessed for use in this test procedure.</p>			
Test Inputs: Specifications for the as-built report generator for the LSM.				
Data Set Name	Data Set ID	File Name	Description	Version

Step-By-Step Procedures		
Step No.	Input Action / Expected Results	Pass / Fail / Comments
10	Production Monitor-QA: Verify that there is a fully operational site computer configuration.	
20	Production Monitor-QA: Verify that the site report generator and input data sets are available for access.	
30	Expected Results: Data sets representative of the full range of data types are available to be operated on by the report generator.	
40	Production Monitor-QA: Request use of the site report generator to produce a standard report.	
50	Expected Results: Display of steps involved in producing standard or customized reports through use of the site report generator, from user request through output to selected media.	
60	Production Monitor-QA: Define a report that generates detailed and summary information on training programs, training course schedules, training course contents, training course locations, and training attendees.	
70	Expected Results: Output includes a complete demonstration report that compares with the expected information.	
80	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
90	Production Monitor-QA: Define a report that generates summary information showing the site inventory of hardware, system and scientific software, and spares and consumables.	
100	Expected Results: Output includes a complete demonstration report.	
110	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
120	Production Monitor-QA: Define a report that generates information showing site proposed enhancements with a proposal name, description of enhancement, rationale, impacts, costs, and milestone schedule.	
130	Expected Results: Output includes a complete demonstration report.	
140	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
150	Production Monitor-QA: Define a report that generates information showing the site performance of ground resources, including resource availability, reason for down time, resource utilization, the ability of resource to meet the performance criteria, and short and long-term trend analysis and capacity planning results.	

160	Expected Results: Output includes a complete demonstration report.	
170	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
180	Production Monitor-QA: Define a report that generates information showing the site fault management reports describing the fault management of ground resources, including, fault type and description, time of occurrence of fault, effect on system, status of fault resolution, and fault statistics.	
190	Expected Results: Output includes a complete demonstration report.	
200	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
210	Production Monitor-QA: Define a report that generates information showing the site security compromise reports indicating security compromises of ground resources and facilities, including, security compromise type and description, time of occurrence, cause of security compromise, impact on system, status of security compromise resolution, security compromise statistics, and results of security compromise risk analysis.	
220	Expected Results: Output includes a complete demonstration report.	
230	Production Monitor-QA: The output format is evaluated for correctness as well as readability and satisfactory presentation.	
240	Production Monitor-QA: Each of the previous report demonstrations is evaluated for adherence to report format and content specifications.	
250	Expected Results: The outputs include completed demonstration reports that compare expected versus actual outputs.	
Data Reduction and Analysis Steps: A fully operational SMC computer configuration is required, ready to produce the specified reports including input data sets that are representative of nominal and special cases for each of the required report formats. A. Evaluating report capabilities include generation of: <ol style="list-style-type: none"> 1. a functional allocation report giving the current allocation of ground segment functions; 2. summary configuration status reports; 3. summary training reports; 4. hardware, system and scientific software reports; 5. spares and consumables reports; 6. ground resources performance reports; 7. fault management reports; and 8. security compromise reports. 		
Signature:		Date: